

Memories of Sabre Not Fond for All



WASHINGTON, D.C. — American Airlines' Sabre system — the first computerized airline reservation system — has gained itself a place in the Smithsonian Institution, but is remembered less fondly by many of those who worked with it.

The system, which went into service in 1962 and was retired last year, was the first experience many people had with computer systems, and many reservation operators remember its dehumanizing aspects.

It will be put on display in the Smithsonian's "History of Computers" exhibit.

Based on an IBM 9090 computer, the console of which is shown here, the system handled an average of 100,000 phone calls a day in 1968.

Of these, 37,000 were reservations, 30,000 were requests from other airlines, 16,000 were inquiries for flight arrival and departure information and 17,000 were requests from travel agents.

One experience using the system was described by Beryl Simpson in Studs Terkel's

book, *Working*, which was copyrighted in 1972 and 1974 and published by Pantheon Books, a division of Random House, Inc. Her story follows:

My job as a reservationist was very routine, computerized. I hated it with a passion. Getting sick in the morning, going to work feeling, Oh, my God! I've got to go to work.

I was on the astrojet desk. It has an unlisted number for people who travel all the time. This is a special desk for people who spend umpteen millions of dollars traveling with the airlines. They may spend ten thousand dollars a month, a hundred thousand a month, depending on the company. I was dealing with the same people every day.

This is so-and-so from such-and-such a company and I want a reservation to New York and return, first class. That was the end of the conversation. They brought in a computer called Sabre. It's like an electric typewriter. It has a memory drum and you can retrieve that informa-

(Continued on Page 3)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

© 1977 by Computerworld, Inc.

Price: \$15/year

February 7, 1977

Vol. XI, No. 6

Bubble Device Put to the Test

By Don Leavitt
Of the CW Staff

DETROIT — A message recording/playback machine believed by Bell Telephone Laboratories to be the first application of magnetic bubble memory technology is being tested at the Michigan Bell Telephone Co. offices here.

Known only as the 13A Announcement System, the device is being used to record and then announce 12- or 24-second "call assist" messages such as "We're sorry. You have reached a nonworking number."

Although the technology has been the subject of much talk in computer design circles, a Bell Labs spokesman was quick to stress that the 13A is "in no way a computer."

The machine contains neither stored programs nor hard-wired logic to react to variable input. It is being used to record and then announce standard repetitive messages "and that is all it was designed to do," he added.

Access to the messages is controlled by routing and switching gear completely outside the 13A itself, the spokesman emphasized.

Bigger Than a Breadbox

Within the machine, described as "a little larger than a breadbox," the messages are stored in digital format in a code represented by the presence or absence of tiny magnetic bubbles in a memory medium on printed circuit boards.

Each board contains a maximum of two magnetic bubble packages. Each package, "about half the size of a cigarette pack," contains four bubble chips, the spokesman explained, and each chip can store up to 68,121 bits of information.

The storage capacity of each package is enough for 12 seconds of digitized speech, he added.

The machine electronically encodes speech into digital form before it is stored in the magnetic bubbles. An electronic decoder reconstructs the original voice signals when needed.

(Continued on Page 5)

Test Finds Safeguards Faulty

SSA Cracks Medicare Security System

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Despite assurance that it couldn't be done, the Social Security Administration (SSA) succeeded in penetrating the security system designed to protect the computerized records of millions of Medicare patients.

The safeguards in the system, which links SSA's Medicare files with an office of the Aetna Insurance Co. in Fort Washington, Pa., and the Medical Service Association in Hawaii, failed during a test on Dec. 2, according to an SSA spokesman.

These insurance companies process Medicare claims for the government.

The test was conducted to determine whether 14 additional insurance companies should be granted access to the system, the spokesman explained.

By Dec. 3, the safeguards were modified to prevent a similar invasion of other files that contain data on medical conditions, family composition, marital status, institutional commitments, guardianship, income, expenditures and assets of hundreds of

thousands of Americans, the spokesman said.

SSA's disclosure of the results of its test in a Dec. 29 letter to several members of Congress coincided with the preparation of a 300-page report on federal computer security by the Senate Government Operations Committee.

The report, released last week, concluded

that stricter legislative and administrative controls should be adopted to prevent system intrusions for criminal purposes (see related story on Page 3).

The SSA designed its new national network in hopes of reducing the cost of administering Medicare insurance programs and plans had been developed to extend the

(Continued on Page 4)

Firm Size Proves Major Factor In Operator, Key Punch Salaries

By Ann Dooley
Of the CW Staff

WASHINGTON, D.C. — Computer operators and keypunch personnel in large establishments earn salaries substantially higher than the national average, while metropolitan size hardly affects earnings, according to the U.S. Department of Labor's Bureau of Labor Statistics.

Average salaries for keypunch operators and supervisors increased 7.6% and 7.5% respectively during the year ended March 1976, according to the Bureau of Labor Statistics, which released all figures in terms of monthly salaries.

From 1962 to 1976, operators' salaries increased an average of 5.5%. Supervisors and computer operators were not documented in the bureau's "National Survey of Professional, Administrative, Technical and Clerical Pay" because of the lack of statistical information, the report said.

The bureau divided the three DP occupations into different levels of qualifications and job responsibilities. Statistics were also correlated within a metropolitan region, in establishments of over 2,500 workers and for employee distribution by salary.

In most levels, average salaries for employees in metropolitan areas were only slightly higher than average salaries in all establishments. However, earnings varied greatly according to levels.

The most dramatic variations occurred within establishments of 2,500 employees or more, where DP personnel earned salaries significantly higher than the national norm.

Level I computer operators, whose work assignments consisted of on-the-job training under close supervision, earned an average national salary of \$647.

(Continued on Page 6)

Burroughs Tops Off B800 Line With CPU in 370/168 Range

By Esther Surden
Of the CW Staff

DETROIT — Burroughs Corp. capped its 800 family last week with the introduction of the B7800, a mainframe said to be in the performance range of the IBM 370/168.

The system, which offers users up to 2.5 times the performance of the firm's B7700, is the largest and most powerful general-purpose system Burroughs offers, according to a spokesman. It was designed for large on-line networks and data base management applications.

The B7811 with 1M byte of memory costs \$2,497,600 compared with IBM's 1M-byte 370/168-3, which costs \$3,302,400, Bur-

roughs said.

The two models announced — the B7811 and B7821 — are object-code compatible with the B7700, B6700 and the newer B6800 systems. "Programs may be moved upward through the range without reprogramming or recompiling," Burroughs said.

In addition, current B7700 users can intermix B7800 CPUs, I/O processors, memory and data communications processors on their present systems, the spokesman said.

The B7811 is configured with one CPU and one I/O processor while the B7821 has two CPUs and two I/O processors. Each

(Continued on Page 4)



EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Associate Editor	Molly Upton
Assistant Editor	John P. Hebert
Computer Industry Editor	Toni Wiseman
Washington Bureau	Edith Holmes
Staff Writer	Catherine Arnst
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Bobbi C. Sternheim Barbara T. VanScoyoc
Photography Editor	Ann Dooley
Editorial Assistant	Denise Petski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger R. Frampton
Munich	Dr. Gerhard Maurer
Asia	Hidetuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone
Contributing Editor	Edward J. Bride

SALES

Vice President/ Marketing	Roy Einreinhofer
Advertising Administrator	Judy Milford
Display Advertising	Sara Steets
Classified Advertising	Pam Palmer
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/ Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529.

OTHER EDITORIAL OFFICES: England: Computerworld Publishing Ltd., 140-146 Camden Street, London NW1 9PF. Phone: (01) 485-2248/9. Telex: 264737. **W. Germany:** Computerworld, c/o Computerwoche GmbH, 8000 München 40, Tristansstrasse 11. Phone: 36-40-36/37. Telex: 5215350. **Asia:** Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. Copyright 1977 by Computerworld, Inc. All rights reserved.

50 cents a copy; \$15 a year in the U.S.; \$23 a year for Canada and PUAS; all other foreign, \$40 a year. Four weeks notice required for change of address. Please allow six weeks for new subscription service to begin.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Walter Boyd. *Computerworld* can be purchased on 35 mm microfilm in half-volumes (six-month periods) through University Microfilm. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

COMPUTERWORLD, INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Massachusetts 02160.ac

Judge Seeks Speedier Trial

U.S. vs. IBM Debating 'Dual Courtroom'

By Catherine Arnst
Of the CW Staff

NEW YORK — An attempt is being made here to turn the pace of the U.S. vs. IBM antitrust trial from that of a tortoise into that of a hare — or at least a faster tortoise.

Judge David N. Edelstein, the referee in this "race," directed the government and IBM to arrange a system by which they can offer documents to the court while there is a live witness on the stand.

Documents, which make up the largest part of the government's case, are currently presented only on days when there are no witnesses.

At those times, the government has been introducing an average of 30 documents a day. Most witnesses have taken a week or more of the court's time, so quite a bit of ground is lost when a witness is on the stand.

Edelstein, who does not attend court

when documents are presented, evidently sees no reason why the two procedures can't be handled simultaneously. However, the logistics involved in carrying out such a two-tiered system are enormous.

About 500 documents remain to be introduced in the government's case against IBM. Lead government attorney Raymond Carlson claimed it would only be feasible from his standpoint to run the new procedure two days a week and use the rest of the week to prepare the documents for presentation.

In this way, approximately 25 documents could be presented each day, Carlson estimated. If the new procedure starts in the next several weeks, all of the government's documents could be in the record by the end of April or early May, he said.

Thomas Barr, lead counsel for IBM, told Edelstein that IBM could operate on the two-tiered system five days a week during the defense. Although he acknowledged

there would be staffing problems for both himself and Carlson, he recommended the schedule because of the large number of depositions IBM plans to present.

More than 700 census depositions and 120 or 130 government agency depositions as well as about 400 live witnesses are planned for IBM's part of the case.

The staffing problems for both parties, particularly if the system were run five days a week, would be considerable. Barr has already requested that the new procedure not begin until some of his staff returns from the West Coast, where attorneys are working on the California Computer Products, Inc. vs. IBM lawsuit.

Staffing for the plaintiff will be the most burdensome, however, because government attorneys are currently assigned to specific subject areas of the case. Defense lawyers have broader assignments and can switch around more easily.

Both parties also said they would have difficulties keeping their computerized digesting system for the documents up to date with the new procedure.

"If we get very far behind in entering the results of the digesting [of the documents] into a computer system, it presents a terrible logistics problem," Carlson told the judge.

The court will also have problems under a two-tiered system. A second room will have to be found, the court clerk's already elephantine job of keeping track of the documents will double and more court reporters and typists will have to be assigned.

Presenting both types of evidence simultaneously will of course speed the trial, but it comes a little late in the race. The government already expects to rest its case by June, and much of the summer will probably be spent in recess.

With the evidence IBM plans to present, its defense will not be speedy no matter what procedure is used.

Correction

In "Used 135s, 145s Going for Half of New," the information on a used 370/155 should have said its price "dropped by \$50,000 to \$60,000 since last summer, with a corresponding \$2,000 drop in monthly lease prices."

Supreme Court Rejects Bell Bid To Clarify Antitrust Jurisdiction

By Molly Upton
Of the CW Staff

WASHINGTON, D.C. — The Supreme Court has declined to consider AT&T's request to clarify whether the U.S. court system has jurisdiction over the antitrust suit filed against AT&T by the Justice Department.

That leaves AT&T waiting at the doorstep of the U.S. Court of Appeals for the District of Columbia, where it had also filed a similar petition for review [CW, Jan. 17].

The appeals court has not yet issued a ruling and is not obligated to do so within any specific period of time, sources said.

After the Supreme Court's rejection of its petition, AT&T filed a motion for accelerated consideration with the appeals court.

At issue is whether the courts have authority to hear U.S. vs. AT&T since AT&T is a regulated monopoly with guidelines handed down by the Federal Communications Commission (FCC).

U.S. District Judge Joseph C. Waddy had

previously ruled the courts in general — and the federal court in Washington in particular — have the authority to try AT&T on the antitrust charges.

AT&T previously indicated it went directly to the Supreme Court because it estimated litigation costs could run to over \$1 billion and thus raise consumer prices as well as taxpayer costs.

The Justice Department had asked the Supreme Court not to consider the case because standard procedures do not permit going to the Supreme Court in the midst of an action, a Justice spokesman said.

In addition, Justice argued the proper body to initially decide AT&T's complaint was an appeals court.

Justice also discounted AT&T's argument that the situation presented a danger of conflict between a federal agency and the courts, he said.

Justice pointed out that this argument did not apply since the FCC had indicated it did not have exclusive jurisdiction in this instance, the spokesman added.

On the Inside This Week

NEWS

DP Executive, Paper Suppliers Face Kickback Charge . . .	5
Programmer/Analyst Job Future Bright	6
Bills Calling for Tanker Traffic Control Drafted	7
DP-Aided Divorce Goes Way of Most Bad Marriages	8
DP Search For Genetics/Cancer Link Started	9
From Micro to Mainframe, DP Aiding Ecology Study	10
Drafting System Gets Bills to Legislature Faster	11

EDITORIAL

Editorial: Legal Changes Needed	12
Human Connection: Training Can Solve Problem	13
Taylor Report: Mixed Mailbag Feeds Column	13
Hiring Marred by Misconception of Technology	14
Wrong Credit Data Menaces Reader's Loan Request	15

SOFTWARE & SERVICES

Manufacturer Builds 'Pages' to Cut OS/VS Overhead . . .	17
File Maintenance Programming Added to 'Misam'	20
'Argos' Improves CICS Development, Debugging	21
DBMS Provides On-Line Order Entry System Base	22

COMMUNICATIONS

HDLC Support Leads List of Honeywell Introductions . . .	23
ICC Extends Options for System 180	24

TERMINAL TRANSACTIONS

New York Times Editors Trade Blue Pencils for CRTs . . .	26
Megadata Extends Intelligent 700 Series	27

SYSTEMS & PERIPHERALS

Soviets Share Data on Process Control	31
Scientists Use Mainframe to Study Spine Problems	32
Managers Must Initiate Problem Solutions, Goals	33
System Helps Decide on Career	34

MINIWORLD

First Univac BC/7 Users Like Programmerless System . .	35
CDC Introduces Matrix Printers	36
Mini at Heart of Chronic Disease Program	37
Dedicated Mini Improves Parts Firm's Cash Flow	39

COMPUTER INDUSTRY

Vendors and Agencies Suspended in TSP Limbo	40
Installed Base Seen Hitting \$70 Billion in '81	40
HIS Makes Formal Commitment to Distributed Mart . . .	41
Univac Hoping for Slice of First-Time User Pie	42
Siemens Gets Order for German Net	43

Senate Study Hits Civilian Agencies for Lax DP Security

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Civilian agencies in the Federal government's executive branch need to strengthen their safeguards against criminal exploitation of their computer systems, according to a study released here last week.

Because of their national security mission, the Department of Defense (DOD), the Central Intelligence Agency (CIA) and other organizations like them have long been aware of the need to protect their DP systems against intrusions, the report by the staff of the Senate Government Operations Committee said.

Entitled "Computer Security in Federal Programs," the 300-page study echoed many of the conclusions made by the General Accounting Office (GAO) in three reports issued last spring.

According to the Senate study, both physical and personnel security measures are lacking to a serious degree in federal systems concerned with highly private or economically valuable data:

- Internal Revenue Service (IRS) computers are presently vulnerable to people who file bogus tax returns aimed at receiving illegitimate tax refunds.

The study cited three instances where large amounts of money were received from the IRS after fake returns were filed.

- The Department of Health, Education and Welfare has automated systems transacting a minimum of \$84 billion in public funds payments annually.

But this agency has almost no capability to investigate criminal abuse and to detect irregularities that could lead to waste or misallocation of federal monies.

- The Civil Service Commission believes computer programmers in federal programs involving privacy data, the disbursement of public funds and economically valuable information should be subjected to full background investigations before they are employed.

But these kinds of background checks aren't being made, except in agencies like the DOD and the CIA where programmers must have security clearance, the study said.

National security information is already designated "critical sensitive." Public funds, privacy and valuable economic data should be placed in this information category as well and accorded the appropriate security precautions, the Senate

Government Operations Committee staff said.

Recognizing that "no computer system is absolutely secure from concerted penetration attacks," the study urged the civilian federal agencies dealing in public funds and personal data to evaluate system vulnerabilities and correct deficiencies under the guidance and leadership of the Office of Management and Budget (OMB).

By the time the committee's report went to print, OMB had already initiated such an effort.

In the past, the National Bureau of Standards (NBS) was responsible for developing computer security standards for use by civilian agencies, the report noted. However, these standards are "vague," according to the committee staff, and NBS lacks the necessary clout to enforce them.

Only OMB, in coordination with the General Services Administration (GSA), can provide effective leadership in the area

of computer security, the study said, adding such OMB leadership is in keeping with the Brooks Bill and the Privacy Act of 1974.

OMB should exercise its authority, not only over the systems operated by agencies in-house, but also in connection with those computer services for which the agencies contract out to the private sector.

Private firms working on federal DP projects should have sufficient notice of the physical and personnel security procedures which the government expects them to follow in their roles as federal contractors, the study added.

OMB should make the GSA responsible for ensuring that the computer-related contracts it carries out for the civilian agencies contain security requirements consistent with the sensitivity of the work being performed by private firms, the study recommended.

Also under OMB direction, the NBS should develop workable physical and

personnel security standards that can be applied by federal agencies and private contractors alike and match the sensitivity of the data contained in individual systems.

Finally, the Civil Service Commission, again under OMB scrutiny, should be charged with developing appropriate personnel security policies to ensure that those hired for DP jobs are responsible enough to handle data considered "critical sensitive," the study noted.

Security Actions

Federal officials with authority for security and investigations in agencies that distribute funds or which contain highly private or economically valuable data should also make sure their personnel are trained in the prevention, detection and prosecution of computer abuse.

All of these actions to improve computer security in federal agencies can be taken without an act of Congress, the study said.

ADR's Automated System Charter™ (ASC) Helps Mobil Oil Stay Ahead

Change at Mobil Oil's New York Headquarters DP Department is a way of life. Over 300 systems are in constant use. And this year 100 systems may be extensively changed and 20 new ones added. "Maintaining up-to-date, standardized systems documentation by hand would be nearly impossible," according to Client Services Supervisor, Jean-Louis Legrand.

ASC produces new documentation in minutes

Mr. Legrand recently helped Mobil Oil install ADR's Automated System Charter (ASC) as a primary tool for computerized documentation maintenance. By using ASC, Mobil has gained many advantages including the establishment of new and simpler standards for programmers. Each time there is a system change, the programmer describes the change on a form submitted through one of Mobil's Client Coordinators for entry into ASC. This results in an automatic documentation update which can be sent throughout the DP Department by printing out a completely new report, produced at only a fraction of the former cost. Reports which would have taken up to 4 days to organize and type manually are now produced in a few minutes—automatically, through ASC.

ASC lets Mobil run systems faster

ASC gives Mobil's Client Coordinator a comprehensive, uniform, and up-to-date tool containing all the instructions he needs to run a system. Because ASC automatically standardizes documentation, the Client Coordinator understands a system faster and can run even a new system after only a few hours of study.

"An important aspect of the ASC document is that it now contains a very clear definition of all the reports coming out of a system along with detailed instructions on how they are to be distributed," Mr. Legrand added.

Improved backup is important

ASC has enabled Mobil to record all system documentation on one tape, with JCL in one library and descriptive comments in another. By dumping these two libraries, Mobil has full backup of all or any part of their documentation. Any report can be reproduced in just a few minutes.

No longer any doubt about being up-to-date

"With ASC, being up-to-date is almost automatic. When changes recur, ASC gives our Client Coordinators the ability to quickly make a copy of the complete, updated document so that everyone can work with the latest information," said Mr. Legrand.

ASC improves system chart quality, cuts costs

"ASC has let us document a system in about half the man-hours we would have normally used. And we have the advantage that the results are more uniform and complete. We do not miss steps as we might in a manual report, and the system chart and program steps are always printed in the same way," Mr. Legrand concluded.

ADR software products are an integral part of over 5,000 installations worldwide. Each ADR product is not just a program, but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.



Mobil

For more information on what ADR software can do for you, call or write



APPLIED DATA RESEARCH *on-line* THE SOFTWARE BUILDERS®

Route 206 Center, Princeton, N.J. 08540, Phone: 609-924-9100.

ADR software products: in use at over 5,000 installations worldwide.

U.S. offices in Boston (617) 245-9540, Chicago (312) 694-2244, Cleveland (216) 228-0880, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (609) 924-9100, Washington, D.C. (703) 281-2011.

Foreign offices in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.

Not All Remember Sabre System Fondly

(Continued from Page 1)

tion forever. Sabre was so expensive, everything was geared to it. Sabre's down, Sabre's up, Sabre's this and that. Everything was Sabre.

With Sabre being so valuable, you were allowed no more than three minutes on the telephone. You had twenty seconds, busy-out time it was called, to put the information into Sabre. Then you had to be available for another phone call. It was almost like a production line. We adjusted to the machine. The casualness, the informality that had been there previously was no longer there. The last three or four years on the job were horrible. The computer had arrived.

They monitored you and listened to your conversations. If you were a minute late for work, it went into your file. I had a horrible attendance record—ten letters in my file for lateness, a total of ten minutes. You took thirty minutes for your lunch, not thirty-one. If you got a break, you took ten minutes, not eleven.

When I was with the airlines, I was taking eight tranquilizers a day. I came into this business [as an employment counselor], which is supposed to be one of the most hectic, and I'm down to three a day. Even my doctor remarked, "Your ulcer is healed, it's going away." With the airline I had no free will. I was just part of that stupid computer.

Burroughs Says B7800 Performs in 370/168 Range

(Continued from Page 1)

system is expandable to a total of eight CPUs or I/O processors in any combination, the spokesman noted.

The B7800 CPU, operating at 8M cycle/sec, has a larger program buffer than its B7700 predecessor. It also features a data reference unit, central data registers and a storage buffer not found in the B7700 CPU.

The B7800 CPU's program control unit, data buffer, execution unit and memory access unit were previously included in the B7700, the firm said.

The program buffer, with a 12K-byte capacity, is 64 times larger than the B7700's program buffer. Its increased size reduces the time the CPU waits for object code to be transferred from main memory, the company said.

The data reference unit calculates the address of data references.

The program control unit, data reference

unit, memory access unit and execution unit operate asynchronously, enabling these different functions to occur simultaneously within the processor, Burroughs said.

The program control unit, in conjunction with the program buffer, prefetches code to be used by the processor. As the data reference unit calculates the addresses of the data references, the memory access unit prefetches the references from main memory and loads them into a 6K-byte data buffer.

The central data registers gather the data references in anticipation of their use by the execution unit, which then handles the arithmetic computations, Burroughs explained.

The storage buffer is a 192-byte local processor memory that holds data before it is sent to main memory. This is said to group memory access to adjacent locations into one multiword memory access, reducing the number of main memory operations.

In addition, Burroughs enhanced its instruction set by reimplementing much of the logic it uses in programmable read-only memory logic. This allows most of the system's operations to be completed in one machine cycle, the firm claimed.

Memory Subsystem

Memory for the B7800 is contained in a memory subsystem made up of two cabinets, one with a control module and the other with up to four storage units for 4K NMOS memory.

Each unit contains 768K bytes for a total of 3M bytes in a single cabinet, Burroughs said. Two subsystems for 6M bytes can be added to the B7800.

The memory has an effective access time of 50 nsec/byte through an eight-word memory phasing and interleaving technique introduced for this system.

For I/O, the B7800 uses I/O processors with up to 28 data channels, each of which

accommodates up to four words of buffering per channel.

A data communications subsystem with broadband communications capability can service data links ranging from 19.2 kbit/sec to 1.3M bit/sec, Burroughs claimed. The subsystem includes a data communications processor (DCP) that requests messages from data communications devices, accumulates them and transfers them to high-speed disk files for access by the main system.

A special control on the subsystem allows high-speed block transfers of messages between the DCP memory and main memory independent of the DCP's operation, the company said.

The B7800 can accommodate up to eight DCPs for a total of 2,048 lines, Burroughs said.

A B7811 with 1M byte of memory, which costs \$2,497,600, can be leased for \$54,100/mo on a one-year plan. The B7821 with 6M bytes of memory costs \$4,436,800 or \$96,700/mo on a one-year lease.

G.I.G.O. Data

presents

DERS V

Data Entry Reporting System V

Daily Production Report

Detail Summary by Job

Overall Summary by Job

Detail Production Report by Operator & Job

Summary Production Report by Operator & Job

DERS V is designed to give the above reports on almost anything if you can get the data on an input tape and have ansi cobol capability. All reports are data selectable making DERS V an excellent tool for review as well as a general management tool. DERS V has or can be used on the following key disk systems: Univac 1900, CMC, Inforex, Entrex, Four Phase, Honeywell, GTE Systems, Data Point, etc. DERS V can also be utilized to produce productivity reports from CICS, IMS, etc.

- | | |
|---|---|
| +1. Operator Name | *13. Productive Time |
| 2. Operator ID | 14. Non Productive Time |
| 3. Batch Date | *15. Key Modes Time |
| 4. Batch Number | *16. Key Stroke rate per hour |
| 5. Key Mode (enter, verify, search, update) | 17. Average Strokes per Record by Job, Operator, Shop, Project |
| 6. Job Name | *18. Number of Errors |
| 7. Shift | *19. Number of Invalid Fields |
| 8. Start Time | *20. Number of Inserts |
| 9. Elapsed Time | *21. Number of Verification Displays |
| *10. Number of Strokes | 22. Effective percentage rate based on Standard by Batch, Job, Operator, Project |
| *11. Record Count | +23. Internal Costs, External Costs, and Difference by Job, Operator, Shop, Project |
| +12. Standard Records per Hour | 24. Generates Resource Accounting Tape (usable by Johnson accounting system) |
| | *25. Effective percentage rate based on pay rate & standard |

* Information provided on Batch, Job, Operator, Shop, Project
+ Base Information provided by User

License Fees: \$30 per month based on 1 year contract
\$25 per month based on 3 year contract
\$20 per month based on 5 year contract

or: Make the full contract payment in advance and deduct 10 percent (Maintenance included in price)

☐ Please send me more information on DERS V
I am also interested in the following:

- ☐ Data Entry Facility Management (split savings)
☐ Data Entry Facility Management (GIGO)
☐ General Key punch Services
☐ Procuring a Data Entry Consultant

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____
ZIP _____ PHONE _____
COMPUTER _____ OPERATING SYSTEM _____

Mail To: Given Input Given Output Data Procedures
3250 Wilshire Blvd., G2 Los Angeles, California 90010
(213) 381-1319 or (213) 387-GIGO

SSA Cracks Security Of Medicare System

(Continued from Page 1)

system over the next two years.

However, the expansion has been delayed as a result of the agency's safeguard test and congressional complaints that the further addition of terminals would represent a potentially serious abuse of the privacy of millions of Americans.

No new terminals will be added until the General Accounting Office (GAO) completes an investigation of the system later this year, the spokesman said.

In his Dec. 29 letter, SSA Commissioner James B. Cardwell told four congressmen who had expressed "grave doubts" about the system's security that its expansion had been halted following the safeguard test.

The four included representatives Frank E. Moss (D-Calif.), Edward I. Koch (D-N.Y.), Charles G. Rose III (D-N.C.) and Barry M. Goldwater Jr. (R-Calif.).

"This gap is, I am afraid, typical of the kind of human error that can render ineffective even the best-designed safeguards for data contained in automated data systems," Cardwell said.

He assured the congressmen that following modifications to the safeguards, tests conducted on Dec. 3 and Dec. 13 proved the changes prevented unauthorized entry into other data bases.

Unfortunately, in letters dated Oct. 15 to Moss and Rose, Cardwell had said a recent modification in the agency's proposed network "will make it impossible" for an authorized insurance company to obtain information from any SSA data base other than the one containing health insurance information.

The safeguard system had also been given the seal of approval at a July hearing before the Privacy Protection Study Commission by Melvin Blumenthal, deputy director for program policy in the SSA's Bureau of Health Insurance, and Dr. Herbert L. Blumenfeld, acting chief medical officer in the Bureau of Disability Insurance.

"I know the assertion has been made that, through the operation of different types of systems, a contractor would have access to information that would be useful [in other areas]. This is simply not so," Blumenthal told the commission.

Blumenfeld also assured the privacy group that no terminal "can be used for any purposes other than those for which it has been authorized."

Correction

In the story describing Univac's BC/7 small business system [CW, Jan. 31], a paragraph on page 6 should have read: "Mass storage can be floppy disk, cartridge or tape. Up to 40M bytes of dual-density cartridge or 3M bytes of double-density floppy disk storage can be added to the system."

DP Executive, Paper Suppliers Charged With Kickback Scheme

By Molly Upton
Of the CW Staff

NEW YORK — A former vice-president in charge of DP and two presidents of paper supply firms have been charged by a grand jury here with a seven-count indictment alleging a kickback scheme.

According to the indictment, the scheme yielded Eugene Corey, formerly of Hartz Mountain Corp., more than \$60,000 in payments from Tabulating Stock Forms, Inc. and Commercial Forms, Inc.

George Barney, president of Tabulating, and Donald H. Krasner, president of Commercial Forms, were also named in the indictment.

The three were charged with defrauding Hartz Mountain of more than \$125,000 by short shipping as much as 50% on purchase orders, according to John R. Wing, assistant U.S. attorney for the Southern District of New York.

Hartz Mountain officials were unavailable for comment.

Corey began requesting kickbacks from

Barney in conjunction with the pet supply firm's purchase of computer paper, stock forms and other paper products from Tabulating in 1967, according to the indictment.

Second Request

In 1970, Corey made the same type of request to Commercial Forms, the indictment said.

Wing said this is the first indictment resulting from an investigation into white-collar crime conducted by his office.

The matter was brought to the unit's attention by Hartz Mountain, he said.

The special drive against white-collar crime is being conducted in conjunction with the Federal Bureau of Investigation in New York and other selected districts, Wing said.

The Shadow No Longer Knows

LOS ANGELES — Like all shadows that disappear under the glare of the noonday sun, IBM's shadow jury has disappeared from the courtroom here in California Computer Products, Inc.'s (Calcomp) antitrust suit against the mainframer.

The project, which involved six courtroom observers and University of Southern California Prof. Donald Vinson, was terminated after IBM admitted it had allocated \$25,000 to fund the project [CW, Jan. 31].

IBM attorneys received notes from Vinson's daily debriefing of the observers — notes that detailed their reactions to courtroom proceedings — and used these in planning the firm's strategy against Calcomp.

IBM felt that once the shadow jury learned the identity of its employer, the group's impartiality would be

jeopardized, IBM had hoped to continue the project throughout the trial, although it recognized the difficulties involved, a spokesman said.

Vinson said he plans to publish a book on the results of the study.

IBM fought against having a jury trial and objected to the specific jury chosen in the Calcomp trial because it included few if any persons whose salaries exceeded jury pay.

IBM may have been compiling the observers' reactions to bolster a possible future argument that the case should be dismissed since the pertinent points in the trial were not correctly perceived by the six observers, sources said.

And, since the six observers appeared to closely match the socioeconomic composition of the real jury, IBM could then argue the real jury did not comprehend the key issues and points made.

Michigan Bell Testing Device With Bubbles

(Continued from Page 1)

The result is said to be a verbal message without the mechanical "flavor" of those built from separately stored words or syllables.

On the machine the 13A has replaced, a message is recorded on a magnetic drum turned by an electric motor. Messages in that environment eventually degrade and have to be rerecorded, the spokesman noted before adding that messages stored on the 13A don't lose quality with repeated playing.

The older machine is about the same size as the 13A, but can handle only one message; the 13A can handle eight, he said.

Magnetic 'Domains'

Magnetic bubbles are actually tiny magnetized areas, or "domains," within special crystalline materials. These magnetic bubbles are highly mobile and can be moved using the same forces that cause magnets to attract or repel one another, the spokesman explained.

Bubbles follow precisely defined paths, deriving power and being guided and switched from track to track "much as trains are in a subway station," he added.

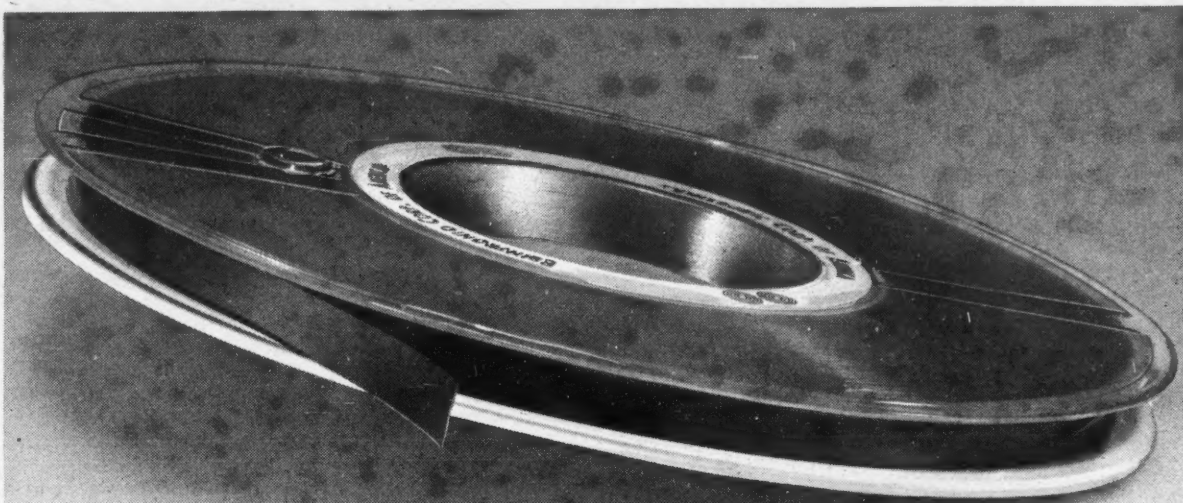
Working with Bell Labs bubble designers, materials specialists devised a technique for growing a special rare-earth magnetic film on a nonmagnetic substrate, or base. That combination of materials produced thin films of magnetic garnet, which the Labs' spokesman described as "ideal hosts" for bubbles because of their magnetic qualities, uniformity and thickness.

Since their invention, magnetic bubbles have shown promise as reliable, low-cost alternatives to other mass storage technologies. For example, the spokesman said, the storage capacity of a magnetic bubble memory chip — the same size as a large-scale integrated circuit chip that can store 16,384 bits of information — is nearly 70,000 bits.

The bits in this application are not arranged into larger groupings such as bytes or words, he added. The actual count of 68,121 bits on a chip is not based on powers of two or any other ordering: "It's just the most bits we could get on that sized chip," he said.

The bubble memory for the announcement machine — housed in a package fabricated by a Bell Labs/Western Electric project team — has 32 pins for external connections and measures 1.2- by 2.2- by .6 inches high. The permalloy outer case provides the necessary shielding against possible external magnetic fields, the Labs noted.

NOW...FOR A LIMITED TIME ONLY...



Take this valuable program **FREE** when you merely test the fabulous CA-SORT!

Yes, because we know how effective CA-SORT will be in your IBM 360/370 installation, we'll send you SYMDATA, our famed test data generator to use and keep just for taking ten minutes to install CA-SORT for a 14 day trial.

DP managers have been delighted to pay for SYMDATA because it takes the fuss and bother out of creating test data files—yet generates an accurate, comprehensive model file to your specifications virtually automatically.

SYMDATA is language independent eliminating the need to modify any source programs. It allows for 14 different field types and for up to 256 definitions per record. It even provides for up to 64 different record types per file.

HERE'S HOW TO GET SYMDATA ABSOLUTELY FREE OF COST!

Simply fill-in and mail the coupon (or telephone us collect). We'll immediately provide you further information on testing CA-SORT and receiving SYMDATA FREE.

Your CA-SORT test is almost effortless. It takes just ten minutes to install in any IBM environment, OS or DOS, and you'll save up to 30% of your sorting costs. It's so easy we don't even have to send a service representative unless you ask to.

You test CA-SORT on your problems, measure the savings in time and money, see for yourself the improvement in throughput. In any event, receive a royalty free license for SYMDATA as a "thank you" gift (subject to a \$50 handling charge and our standard license agreement).

We know you'll save with CA-SORT... that's why this generous FREE gift offer. BUT THIS IS A LIMITED TIME OFFER. So write or telephone today.

COMPUTER ASSOCIATES, INC.
655 Madison Avenue, New York, N.Y. 10021

U.S. OFFICES: New York, Georgia, Illinois, Michigan, California, District of Columbia, Texas, Connecticut.

WORLDWIDE OFFICES: Australia, Austria, Belgium, Denmark, France, Germany, Holland, Italy, Japan, United Kingdom.

***** FILL-IN AND MAIL TODAY *****

Computer Associates
655 Madison Avenue, New York, N.Y. 10021 CW-1/27A

YES—Provide me with further information on testing CA-SORT and the FREE SYMDATA program.

Name (Please Print)

Title

Company

Address

City State Zip

Telephone (Please give area code)

Computer Model System

OR—TELEPHONE US COLLECT FOR FASTER SERVICE:
(212) - 355-3333

COMPUTER ASSOCIATES

Keypunch Prospects Dimmer

Programmer/Analyst Job Future Bright

By Ann Dooley
Of the CW Staff

WASHINGTON, D.C.— Computer programmers and systems analysts will have an easier time finding jobs than people in other fields, according to the U.S. Department of Labor's 1976-1977 "Occupational Outlook Handbook in Brief."

Employment opportunities for programmers are expected to grow faster than the average for all occupations as computer use expands, especially in medical, educational and DP services, the handbook predicted.

The best opportunities will be for programmers with some training in systems analysis, it said.

About 230,000 people were employed as programmers in 1976, according to U.S. Census figures based on three quarters of the year. About 285,000 people are expected to hold programming jobs by 1985.

Annual job openings resulting from growth, death and retirement are expected to remain at about 13,000 through 1985.

Employment of systems analysts is also expected to grow faster than other occupations because of advances in hardware and computer programs and greater demands for efficiency from user organizations.

In 1976, the estimated employment for systems analysts was about 168,000 and the expected average annual openings through 1985 is calculated to be 9,000. About 190,000 systems analysts are expected to be employed by 1985, the handbook said.

Computer service technician employment is expected to be one of the most rapidly growing occupations in the coming years with estimated annual employment in 1976 at 60,000.

By 1985 jobs in this area should grow to 95,000, and job openings are expected to average 4,300 annually.

Less Cheerful Picture

The future for keypunch operators is not as cheerful, however. Annual employment

in 1976 was estimated at about 546,000 and the average annual openings in the next eight years are expected to reach only 27,500.

The growth rate for previous years was much higher, the handbook indicated.

The projected employment figure for 1985 is about 545,000 which shows the number of keypunch operators declining and that of other data entry operators growing.

Employment of console and auxiliary equipment operators should grow faster than the national average in response to the expanding use of computer hardware, especially terminals, the handbook stated.

Employment for the white-collar labor force as a whole is projected to reach 53.2 million in 1985. That figure was 45 million in 1976. Annual job openings in the white-collar labor force are expected to number 34.3 million through 1985.

Job growth in this area was attributed to increased paperwork in all enterprises.

The occupational outlook handbook also indicated the supply of college graduates is expected to exceed demand through the mid-1980s.

Such a situation might lead to rising entry requirements which could start a trend toward hiring persons with the highest educational qualifications available, even

Few Women at Top

WASHINGTON, D.C.— Contrary to popular belief, women have not come a long way in the computer industry, according to statistics from the U.S. Department of Labor's National Survey of Professional, Administrative, Technical and Clerical Pay.

Women constitute less than 5% of the DP work force in professional, administrative and technical support occupations, the survey showed.

In other DP occupations, women were most predominant in low-level jobs and less frequently found at the higher levels.

Of all keypunch operators, 95% or more are women. The first three levels of keypunch supervisors consist of a work force of 85% to 89% women. The fourth level of supervisory work force is comprised of 75% to 79% women.

Level II computer operators include 25% to 29% women and the work force for computer operators on levels I and III consists of only 20% to 24% women.

Only 10% to 14% of the Level IV computer operators are women. And the work force for computer operators on levels V and VI is comprised of a sparse 5% to 9% women.

when degrees are not actually required.

As a result, some graduates are likely to become dissatisfied with their jobs, the handbook noted.

This New Infopac™ is the Only Available Bi-directional On-line Portable Data Collection and Entry System



There's nothing else like it on the market. Completely self-contained including the battery pack, information can be entered off-line at any location, using data entry keys or the wand reader. Data, stored in a solid-state memory, can be transmitted on-line, in any code, to a computer. Infopac will also receive computer inputs on-line, store the data by unit records, and then put it on display at the command of the operator—and each unit record also contains a blank line for entry of variable data.

These are capabilities that others will eventually offer, but that Infopac gives you now! Actually, there are more than 70 standard and optional features offered by Infopac. All are described in our literature, and yours for the asking.

INFOPAC™

AzurData Incorporated
1305 Mansfield Ave., Richland, WA 99352
(509) 946-5161

Offices and Representatives
in Principal U.S. Cities, and Overseas.

Size of Employer Proves Factor in Size of Salary

(Continued from Page 1)

In metropolitan areas that salary was \$649. However, in establishments with over 2,500 employees, these operators earned \$715.

The least amount earned by any member of this group level was \$450, while the highest was between \$900 and \$925. The largest segment of this group, which was 14.9%, earned between \$611 and \$625.

Level III computer operators, who were described as qualified to work with new programs, applications and procedures and able to adapt to a variety of problems, earned a national average salary of \$847 and a metropolitan average of \$851.

Larger establishments paid employees with these qualifications \$936.

Of this work force level, the least amount earned was between \$500 and \$525 and, at the other end of the pay scale, employees earned between \$1,300 and \$1,350.

The largest single segment of this group, 6.8%, earned an average of \$750 to \$775.

At the highest level considered by the report, computer operators VI, the average salary was \$1,254. However, less than 2% of the operators were at this level.

Employees in this classification have a knowledge of program language, are able to test and introduce new programs and can assist in maintenance, development and emergency backup.

In the metropolitan areas, this group earned \$1,266 and, in larger establishments, \$1,272. Less than 1% earned between \$800 and \$825 and 1.5% earned between \$1,700 and \$1,750.

The largest segment on the average, 12.1%, earned between \$1,200 and \$1,250.

Keypunch Supervisors

The second DP group surveyed were keypunch supervisors who were divided into four levels dependent on their qualifications.

Keypunch supervisors I, responsible for the day-to-day supervision of fewer than 20 operators performing routine keypunching operations, averaged \$829. They averaged \$841 in metropolitan areas and did not qualify for analysis in large establishments.

The lowest salary in this level was \$575 to \$600 and the highest earnings averaged between \$1,300 and \$1,350.

The largest portion of the group, 16.5%, earned between \$800 and \$825.

At Level IV, the highest level for which data was collected, keypunch supervisors

averaged \$1,241. In a metropolitan area, they earned \$1,246 and in large establishments they earned \$1,320.

The least amount earned as a group was between \$725 and \$750 and the most was over \$1,800. The largest segment of this level earned between \$1,100 and \$1,150.

In order to qualify for this level, employees must be able to supervise a staff of 50 to 100 employees performing more difficult assignments such as planning and organizing work flow.

Keypunch Operators

Keypunch operators were the third DP group studied and were divided into two levels.

At the first level, the work performed is repetitive, routine and standardized and employees are closely supervised.

At the second level, employees' work

requires the application of experience and judgment in selecting procedures to be keypunched from a variety of sources, according to the report.

The average salary for Level I keypunchers was \$639, \$650 in metropolitan areas and \$762 in establishments over 2,500 workers.

Keypunch operators II earned an average of \$735, \$741 in metropolitan areas and \$828 in large establishments.

Within all levels, salary rates for the highest paid employees were more than twice those of the lowest paid employees.

Of the total number of computer operators and keypunch supervisors surveyed in the private sector, over 40% were found in manufacturing; 30% in finance, insurance and real estate; 20% in trade and selected services; and 10% in public utilities.

Marketing-Minded OEMs Wanted

We're looking for a few firms who will take our best-on-the-market telephone call accounting equipment—add software, hardware, service and maintenance—then present the package to business phone users.

The market for this system is big and it's growing. Business telephone expenses now rank number three behind payroll and rent.

Any company spending \$5,000 a month or more on their phone bill can expect to save 10% to 40% through effective management control. Our PBX telephone call accounting system develops the accurate, reliable data needed to show them just how to do it—by making the best use of WATS, FX and tie-lines, by plotting traffic patterns, by developing accountability for individual extensions, by cutting phone abuse—and a

number of other ways to fine-tune a phone system and trim waste.

We've served the telephone industry for over 25 years and our reputation is one of the best. We want OEMs who will give the kind of service that Alston has built its reputation on.

We offer you systems expertise, technical and sales training and advertising and promotional support.

The opportunity is here. If you think it might be right for your firm, we'd like to talk with you.

Write or call Doug Swain immediately.

ALSTON®
TELEPHONE DATA SYSTEMS
1724 South Mountain Avenue
Duarte, California 91010
Tel: (213) 357-2121



CONRAC
CORPORATION

DP Could Play Part in System

Bills Calling for Oil Tanker Traffic Control Drafted

By John P. Hebert
Of the CW Staff

WASHINGTON, D.C.— A bill calling for a consolidated oil tanker traffic control system has been drafted to reduce shipping accidents in U.S. coastal waters, and computers are likely to be an important part of that system.

The system is part of a legislative proposal filed early this month by Sen. Edward Brooke (R-Mass.). The bill also includes provisions for satellite surveillance and monitoring of tanker traffic and places liability for oil spills with ship owners, according to a Brooke aide here.

If the legislation is passed, it would involve "a good deal more use of [computer] hardware and software," she said.

Three other proposals with oil spill liability recommendations were submitted to the Senate Commerce Committee by senators Edward Kennedy (D-Mass.), Warren Magnuson (D-Wash.) and Joseph Biden (D-Del.) in the wake of the Argo Merchant disaster, which caused six million gallons of

oil to spill into the Atlantic Ocean off the Massachusetts coast [CW, Jan. 17].

In his proposal, Brooke suggested the Coast Guard should have the authority to set up a traffic monitoring system within a 200-mile coastal limit rather than the present three-mile limit.

The inspection and surveillance capability of the Coast Guard should also be expanded and special attention should be given to the possibility of regular satellite monitoring, Brooke proposed.

In addition to these moves, the senator suggested the National Transportation Safety Board (NTSB) be given a new role in assembling and keeping a safety history on each vessel entering U.S. ports so it can be checked at each entry.

The NTSB is the most appropriate organization to handle a vessel-tracking

system because "there are experts there who are not being utilized," the aide said.

In this role, the NTSB would maintain historical information on ships, identify them, plot their intended courses and track them. It would then alert the Coast Guard when violations of shipping regulations or accidents in U.S. waters occurred.

Satellite Surveillance

The bill also calls for establishing a vessel traffic monitoring system by satellite surveillance within the U.S.' 200-mile coastal zone.

Brooke also recommended stringent standards for oil tanker construction and operation and placing liability with ship owners for damages from toxic substances and indicated the possible utilization of on-board minicomputer recording devices to supply a

written record of voyage events would be beneficial, according to the aide.

Since ships' logs have been written by hand for centuries, implementing long-range navigational transponders and computerized recording devices would be going against tradition, the aide noted.

Brooke's proposed Spill Prevention and Cleanup for Energy Transportation Systems Act is expected to be incorporated with the other proposals and come out of the Commerce Committee as the Magnuson Bill.

Whether there will be provisions in the final bill for the development of a centralized or computerized information system is not clear.

"But there will definitely be legislation out of that committee this spring," the aide said.

Data Base Designed To Minimize Effects Of Shipping Accidents

By a CW Staff Writer

MALMO, Sweden — A computer-based data bank is helping owners of large ships and salvage companies make quick decisions after an accident at sea to minimize damages.

Models of more than 3,500 ships, including each vessel's dead weight, draft, shear forces and hull stress capabilities, are maintained in a system designed here by Kockums Automation, a member of the Kockums Group that includes a major shipyard.

Each time a subscriber's ship leaves port, details of its cargo and the loading plan are entered into the data base, according to William Grunow, president of Marine Measurements, Inc. of Summit, N.J., the firm marketing the system in the U.S.

If that ship is involved in a collision, grounding or other accident, the owners or salvors can access Kockums' T-90 software system, maintained on General Electric Co.'s international Mark III time-sharing network, at any time.

T-90 users can retrieve a ship's specifications, a description of its condition when it left port and a description of the casualty, including a list of suggested actions for that accident.

For example, if oil must be unloaded from a grounded tanker to prevent further damage to the vessel or to prevent oil spills, the safest procedure can be determined in minutes by the Kockums T-90. Without the use of this data bank, such calculations might take days or even weeks, Grunow claimed.

The T-90 data base is intended primarily for larger ships because the deeper draft vessels are more difficult to maneuver, will inadvertently discover whether charts of the ocean bottom are incorrect and are more costly to build, Grunow said.

Big tankers generally cost more than \$100 million each while their cargoes average between \$5 million and \$10 million, so there is every reason for the owner to invest in aids to make his jobs easier and more secure, he explained.

The program input charge to the T-90 system is \$1,500 for a single class, or type, of ship built by the Kockums Group yard, and about \$300 per year in subscription costs.

The input charge for a ship not built by Kockums is about \$4,000, plus the \$300 annual cost, which includes updates.

The service began in the U.S. within the past month because of the recent rash of oil tanker accidents, Grunow said.



When we plant a terminal...

It gets as much TLC as Marilyn gives her potted Spathiphyllum.

Terminals are just as sensitive as plants so it's important to pick the right one for your job. That's why Trendata offers a wide range of printing terminals and magnetic tape recorders to fit any number of applications.

And since terminal productivity stems from proper training, Trendata field reps make sure your people understand all the



do's and don'ts of terminal operations.

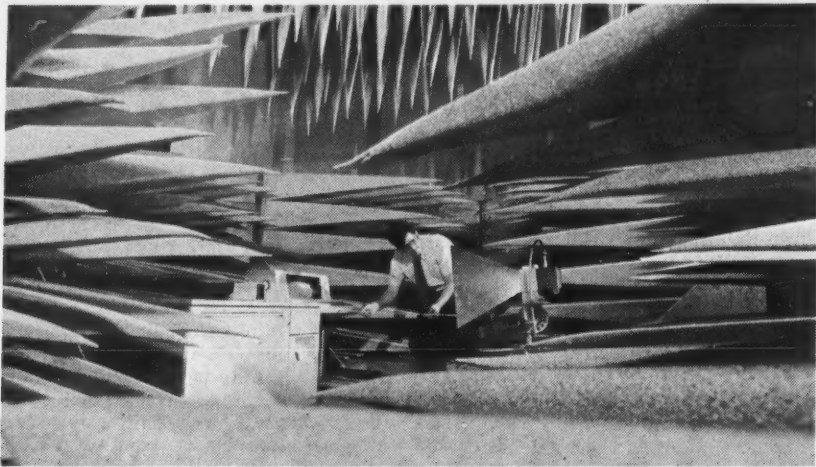
Should maintenance problems arise, they are immediately pruned out by our own nationwide service people. The last thing you need is a terminal withering on the line.

As we mentioned, anything that grows needs TLC... and if your system isn't getting Terminal Loving Care, we'd like to cultivate a little conversation.

trendata

610 Palomar Ave., P.O. Box 5060,
Sunnyvale, CA 94086 (408) 732-1790

AN APPLIED MAGNETICS COMPANY



A Piercing Subject

ROCHESTER, Minn. — Is it the jaws of a shark? Is it a scene from a grade B science fiction movie? No, it's acoustical cones on the walls and ceiling of a special cell IBM built to test a computer system. The six-foot-long cones minimize reflections of electronic signals, allowing engineers to ensure they are not being radiated from the System 32.

system/3 payroll?

Of course Wang has it, and fully supports it year-round, for FICA, for Federal, State and most city taxes, for labor reporting and for more than 100 standard reports, including EEO personnel reporting...

For more on System 3/Payroll call Joe Nestor at (617) 851-4111 Wang Laboratories, Inc., Lowell, Mass. 01851.

In California call Carl Tarascio at (714) 631-0181.

WANG

DP-Aided Divorce Project Goes The Way of Most Bad Marriages

By Edith Holmes
Of the CW Staff

CHICAGO — The Cook County Legal Assistance Foundation spent more than half a million dollars to develop a computer system that would generate ready-to-file divorce lawsuits, but there just weren't enough cases here to make the system pay off.

Late last fall, after six years of effort, the local agency lost its funding and turned in its rented Digital Equipment Corp. PDP-11/20, according to Henry Browne, director of the project.

But the project was not without its benefits, Browne said. Nearly 1,000 clients, mostly low-income women, explained their marital problems to the system and saw their cases expedited.

"Many of these people were served in a way they couldn't have been without the system," Browne said.

In addition, the two and a half year backlog in divorce cases faced by the Legal Assistance Foundation before the computer system became operational in 1974 was cleared up, he noted.

But a divorce can't be produced much more cheaply with a computer than manually, Browne said. "The documents involved are complicated and the volume of divorce cases the system handles must be great enough to lower the cost of processing each case," he explained.

The software, written by International Computer Applications in Madison, Wis., permitted attorneys with no previous DP experience to write "programs" — actually interviews with clients seeking a divorce.

At each of the foundation's three branch offices, divorce clients were asked a series of 300 to 400 questions requiring multiple-choice or very short answers. The programs focused on the four most common of the 11 grounds for divorce in Illinois: physical cruelty, desertion, mental cruelty and habitual drunkenness.

The interviews took anywhere from 20 to 40 minutes and at their conclusion the system generated the necessary papers.

All was not automated, however. Because so many of the clients had reading problems or were unfamiliar with English, the foundation found it necessary to use paralegal aides as intermediaries between the system and its clients, Browne said.

Once clients understood the machine wasn't a lie detector and wasn't capable of granting an instant divorce, Browne said, the interviews went smoothly. Clients came to prefer the system because they believed it would speed up their cases, he added.

Since 1971, the annual operating budget for the system totaled \$120,000 with the goal of testing whether this means of delivering legal services would be more effective than the manual approach.

The system would have been more cost-effective if it had also drawn up papers for other types of routine legal problems, like bankruptcy and wills, Browne said.

The Cook County system did include a bankruptcy program, but Browne noted that most of the people served by the foundation are low-income clients who don't have much to worry about in the way of wills.

A private agency that received funds from Congress to pay for the Cook County project said the system cost \$150,000 to develop. It consisted of the 24K CPU, disk storage with tape backup, four Applied Digital Data Systems, Inc. (Addis) 840 CRTs, three General Electric Termiter 300s and one 1200, a portable Addis Envoy 660 CRT, Astrocom modems, voice lines and Bell data sets.



Washington is where it's at!

Want to know how other datacomm users and consultants solve problems? Come to DataComm 77, Sheraton Park Hotel, Washington, D.C., March 9-11, 1977. Leading users will be on hand to brief you on ways they put datacomm to work. Here are some of the speakers:



D.J. Blackwell, Mass. Mutual Life Insurance Co., Network Optimization

W.R. Nugent, Asst. Dir. for Information Systems Development, Library of Congress
T.R. Balfanz, Dir., Systems Dept., Aetna Life & Casualty
J.W. Hall, Mgr., Communications Services, CARS Inc.
J.A. Blanco, Pres., Space Age Computer Systems Inc.
L.L. Pilate, Mgr., Data Communications, Burlington Northern
P.V. Permut, Chief, Policy & Rules Div., Common Carrier Bureau, FCC
S. Wecker, Consultant, Distributed Processing Networks
Lt. Col. R.C. Cournoyer, Chief, Record Networks Management Div., Defense Communications Agency
T. Miller, Pres., Government Sales Consultants, Inc.
W.M. Malone, Branch Chief, Systems Development, Air Force Systems Command
H. Uhrbach, Pres., Data Base Design Systems
H.F. Wolf, V.P. Gnostic Concepts
R.C. Podesta, V.P. Holidex Operations, Holiday Inns
D.J. Blackwell, Sen. V.P., Mass. Mutual Life Insurance Co.
J.L. Hughes, V.P., First National City Bank
J.E. Letson, Sr. V.P., Basche Halsey Stuart

And, there are many more. Including representatives of Government agencies who will fill you in on legislative and regulatory matters every datacomm user should know about. For more information, write DataComm 77, 60 Austin Street, Newtonville, MA 02160. Or call our Toll-Free Hot Line 1-800-225-3232. (In Mass. and Canada call 617-964-4550 collect).

DataComm 77 is organized by the Association of Data Communications Users, Auerbach Publishers, Computer & Communications Industry Association, Canadian Data Systems, Computer Decisions, Computerworld, DataComm User, Datamation, and InfoSystems.

DataComm 777
Where the action is!

APO gives you more of what you bought VS for. Automatically.

You bought VS for greater flexibility and less dependence on resources such as core.

But, what did you really get?

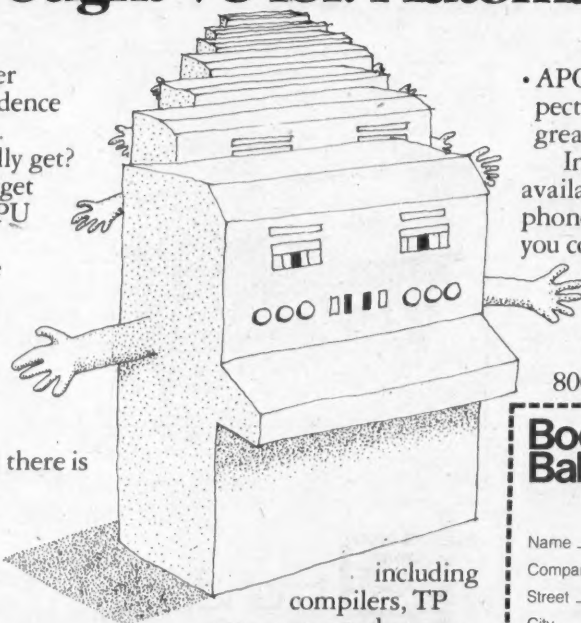
At certain times, you get excessive paging, high CPU usage, as well as poor throughput and response time.

The cure is easy.

APO optimizes your working sets. That means you use less core. You also reduce your paging load which means there is less use of VS resources.

APO does it all.

- APO automatically restructures programs for optimum paging without requiring the purchase of any hardware.
- APO works on all programs,



including compilers, TP programs, vendor supplied programs and your own programs.

- APO really works. You can expect improvements in paging as great as 91%.

Information about APO is available in writing or over the phone. Get one or the other when you contact us. Boole & Babbage Inc., 850 Stewart Drive, Sunnyvale, CA 94086. (408) 735-9550. Outside California dial toll free 800-538-1872.

Boole & Babbage

Dear Charlie: I'm ready. I need the whole APO story. Send me the facts before my VS system gets the better of me.

Name _____ Title _____
Company _____
Street _____
City _____ State _____ Zip _____
Telephone _____ MySystem _____

DP Search for Link Between Genetics, Cancer Starts

SALT LAKE CITY, Utah — Mormon Church genealogy records are being computerized at the University of Utah Medical Center here to study the role family history may play in serious illness.

Eventually, the information could help in the prevention and early detection of cancer and other diseases, according to Dr. Homer Warner of the university's Medical Biophysics and Computing Department.

Using a Control Data Corp. 3300 computer system funded by the National Institutes of Health's Division of Research Resources, a group of investigators headed by Dr. Mark Skolnick, a population geneticist, will link the genealogy of 250,000 Mormon families with medical records to test several genetic hypotheses related to disease.

Warner, a Mormon church official, called the genealogy records "a unique data base that makes up the most detailed family relationship records in the U.S."

Medical authorities now believe certain types of cancer run in families. "If a family at risk can be identified, then it might be

possible to identify individuals within that family who have traits corresponding to genes which might predispose them to cancer," Warner said.

Genetic Markers

If a strong family relationship is confirmed, investigators will search for a relationship between certain genetic markers — such as fingerprints — and cancer. These genetic markers could be quantified for computer use to help identify high-risk individuals within these families.

"By identifying these people early, we can expose them to unusual detection efforts that would be cost-prohibitive to carry out for the entire population. With such thorough testing, we should be able to identify many lesions before they become malignant," Warner said.

"We also can improve cancer prevention by counseling these people on environmental dangers — such as poor diet and

smoking — which may trigger the start of cancer," he added.

Skolnick already has used family relationships to determine individuals with a high risk of contracting Wilson's disease, a neurological disorder which can result in the destruction of the liver. Utah researchers also plan to apply this approach to coronary heart disease, cerebral vascular disease and "the whole spectrum of illness."

Family Charts

Right now, however, the study is concentrating on translating the Mormon Church genealogy records into computer-usable language.

"Each Mormon is encouraged by the church to fill out a four-generation family chart which is kept by the Genealogical Society in the Mormon Church Office Building here," Warner explained. "Research assistants photocopy the family

charts and bring the copies to nearby Latter Day Saints Hospital where the information is entered into the computer.

"With this data the computer will reconstruct a detailed family history of the entire Mormon Church population in Utah.

"We hope to link this history to hospital medical records, death records and the state's cancer registry to gain an insight into the role genetics plays in causing cancer. From here, it should be possible to search the medical file for all patients having any particular disease and then locate these same patients in the genealogical files to determine interrelationships," he said.

Warner emphasized that the privacy of each individual will be "scrupulously protected."

Rather than identifying records by name, they will be coded using a Soundex system. To form the code, the sound of the patient's first and last name is combined with his birth date.

Net Set Up to Curb Bad Drug Reactions

By Ann Dooley
Of the CW Staff

COLUMBIA, Mo. — Adverse reactions to all types of drugs may be eliminated soon through a national network designed to let physicians know the drugs' effects before they are prescribed.

The Computer-Based Drug Information System contains data on more than 12,500 prescription and nonprescription drugs, according to Dr. Samuel Garten, director of the project at the University of Missouri School of Medicine here.

The information, which is stored on an IBM 370/168, was gathered from medical literature and actual clinical observation, Garten said. Data on precautions, adverse effects, preparations, dosage mixture and other factors was supplied by the U.S. Food and Drug Administration's Bureau of Drugs.

The program, which began operations only recently, has about 50 users, mostly in major metropolitan areas, but Garten hopes health care professionals throughout the country will eventually make use of it.

Determines Incompatibility

To use the system, the physician enters the names of the drugs he is considering for a patient's treatment and requests the effect of their interaction through a terminal. The system determines whether the drugs are incompatible and lists their effects.

The system also outputs information on clinical applications, experimental evidence and references for further study.

If a doctor is confronted with a reaction, he can enter the symptoms and receive a list of drug interactions which could be responsible. Using the system, he could isolate the particular combinations causing the problem, Garten said.

"Even a beneficial drug such as aspirin can be dangerous if mixed with other drugs," Garten explained.

Avoids Confusion

The system will be of particular benefit to hospital users who administer a number of drugs to a single patient. Some medicines might mask symptoms or create false symptoms relating to the patient's disease, but any drug and its effects would first be checked through the data bank to avoid any diagnostic confusion, according to Garten.

People are admitted to hospitals every day because of the effects of drugs, and one-seventh of all hospital days are devoted to treating drug reactions, he noted.

The system is free to all users because it is partially funded by the U.S. Public Health Service. The project is a joint effort of the Information Science Group and the Medical Computer Center of the university's medical school.

Programmers: Teach yourself COBOL

For the last six years *Standard COBOL* by Mike Murach has been a best selling college text. It is currently used for vocational training in dozens of junior colleges as well as for computer science courses in many large universities.

Since May 1976, we have sold this book to DP professionals for self-education. We sell this book with an ironclad guarantee: If you can't learn COBOL from it, you can return it for a full refund... no matter how long you've had it.

Now, the results speak for themselves. Less than 60 out of every 1000 buyers have returned the book. And many people have taken the time to write. Some examples:

"I don't need 30 days to tell you how wonderful your *Standard COBOL* is. Many of my questions which until now have gone unanswered were answered well, especially with the aid of your example programs."

"The clarity of your explanations have allowed me to understand and use functions of the language I had not tried before."

"The order of presentation is most interesting and useful."

"We have found the book very useful — particularly, the approach of being able to write a program without reading the entire book."

This book has been used by thousands of students with no programming experience but it can also help those with limited experience. It emphasizes System/360-370 ANS COBOL under DOS or OS so it is ideal for IBM shops. But it can also be used with any system that has a standard compiler since it is based on ANSI standards.

3 Reasons Why This Book is Effective

1. The content was selected based on an analysis of the tasks normally done by a COBOL programmer in industry. That's why these books contain everything of use to the average programmer and very little that isn't.

2. The books are organized in the most effective way possible for a programming course. Quite simply, a complete subset of COBOL is presented in the first two chapters. After this, all material is organized by function (debugging, table handling, subprogram linkage, etc.). You learn more efficiently with this approach

because you always see the relationships between the language elements.

3. Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve indexed, direct, and relative files. In our experience, these listings more than any other factor determine whether or not a course is effective. And they are the missing ingredient in most COBOL courses.

Content

The intent of this book is to teach the skills of an applications programmer in industry. As a result, the first five chapters present a professional subset of COBOL. When you complete this section, you will be able to write complete card-to-printer programs, to code DOS or OS JCL for compilations and test runs, to debug both normal and abnormal program terminations.

The second section expands the subset by presenting many of the COBOL refinements. Here, you'll learn such skills as how to use SET and SEARCH for table handling, how to use the source statement library, and how to write and call sub-programs.

The third section deals with file handling. When you complete it, you'll be able to create sequential, indexed, direct, and relative files and to retrieve records from them.

In the last section, you'll learn how COBOL is related to System/360-370 hardware and how this relates to object program efficiency... you'll learn how to code DOS or OS JCL for file handling programs, for library

maintenance, and for linkage editing... you'll learn what installation standards are and how they affect the COBOL programmer.

30 Day Trial and Unlimited Guarantee

Because there are so many ineffective books in our field, I don't expect you to take my word for any of this. That's why I make this two-part offer.

First, take 30 days to review the book. If you return the book within that time, forget the bill. No questions asked.

Second, if you discover after 30 days that you can't learn COBOL from our book, you can return it for a complete refund. There is no time limit on this guarantee.

So mail the coupon today. For each book ordered, I'll bill you \$15 plus postage (and sales tax in California). And if you want to learn System/360-370 assembler language, why not order one of our assembler language books too... same price, same effectiveness, same guarantee.

Attention: Training Managers

Why not order a trial copy today? Many companies such as Pacific Telephone, Blue Cross of Greater Philadelphia, and Cincom Systems have ordered 10 or more copies either for training or reference. Although this book doesn't teach structured programming, we guarantee that it will outperform any other COBOL materials when it comes to language instruction. And it will improve the effectiveness of any COBOL course.

Mike Murach & Associates, Inc., 4905 North West Avenue, Suite 102, Fresno, CA 93705

Gentlemen: Please send me the books I have ordered below. I will take up to 30 days to review them with no obligation. After that, if the books don't prove to be effective, I will return them for a full refund. I understand I will be billed \$15 plus postage (plus sales tax in California) for each book ordered.

Quantity	Book
_____	Standard COBOL
_____	DOS Assembler Language
_____	OS Assembler Language

SAVE \$2.50... Send cash with order and your price is \$12.50 per book plus 50c for postage and handling (plus 75c sales tax in California). The unlimited guarantee still applies. If you return the book, you will receive a prompt refund.

Name and Title _____

Company _____

Address _____

City, State, and Zip _____

From Micro to Mainframe, DP Aiding Pollution Study

By Ann Dooley
Of the CW Staff

CHICAGO — A study to determine the extent of ecological damage from atmospheric pollutants over Lake Michigan is being aided by computers.

Conducted by Dr. Herman Sievering, pro-

fessor at Governors State University, the three-year, \$250,000 Environmental Protection Agency (EPA)-sponsored research group is presently developing the specialized instruments needed to track the route of pollutants over the lake.

In April, the group will board a former

U.S. Coast Guard buoy tender and take measurements with a parachute-like device which registers weather conditions such as wind speed, direction, altitude and the sample time.

Information provided by the parachute and a laser, which can count up to 10,000 particles of pollution in a given space per second, will be entered into a microprocessor based on an Intel Corp. 8080 chip.

The information will be transferred to a dual cassette magnetic tape unit from the microprocessor.

emitted lead that gets into the lake.

The group hopes to find out the rate at which atmospheric particles of various sizes are deposited into the lake and the relationship between the weather and the manner in which particles are transported over the lake, according to Sievering.

It also hopes to discover whether atmospheric pollutants are more harmful than land pollutants.

"We will also study the nutrient overloading of the lake since such overloading leads to a lake's death," Sievering said.

"Our highest priority is to study the process by which particles eventually get into the lake. The critical part of the whole thing is to find out how fast the particles are moving into the water," he noted.

The results of the study will be given to the EPA to aid in deciding whether controls should be imposed on new plant construction and plants already in operation around the Great Lakes, he added.

Calendar

March 1-2, Washington, D.C. — **Federal Office Equipment Expo**, Contact: National Trade Productions, 3740 39th St. N.W., Suite 155, Washington, D.C. 20016.

March 1-3, Anaheim, Calif. — **Nepcon '77 West and International Microelectronics Conference**, Contact: Industrial & Scientific Conference Management, Inc., 222 West Adams St., Chicago, Ill. 60606.

March 7-9, Boston, Mass. — **Seventh Annual Telecommunications Seminar**, sponsored by the National Retail Merchants Association (NRMA), Contact: Jan Aaron, NRMA, 100 West 31st St., New York, N.Y. 10001.

March 7-9, Houston; March 28-30, New York — **Project Management for Computer Systems**, Contact: Information Systems Seminars, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

March 9-11, Washington, D.C. — **Datacomm 77 Conference and Exposition**, Contact: Carol Iredale, Datacomm 77, 60 Austin St., Newtonville, Mass. 02160.

March 10, St. Louis — **Computer Impact on Society**, sponsored by The Association for Educational Data Systems, Contact: Ralph Lee, P.O. Box 951, Rolla, Mo. 65401.

March 11, St. Louis — **The Development and Evaluation of Educational Programs in Computer Science and Data Processing**, sponsored by the Association for Educational Data Systems, Contact: Ralph Lee, P.O. Box 951, Rolla, Mo. 65401.

March 13-16, Dallas — **Forum International 1977 Spring Conference**, Contact: P. Glynn, Forum, International, 4902 Tollview Drive, Rolling Meadows, Ill. 60008.

March 18, Los Angeles — **1977 Digital Computer Association Meeting**, Contact: R.R. White, DCA Chairman, c/o Informatics, Inc., P.O. Box 1452, Canoga Park, CA 91304.

March 19-20, Los Angeles — **The Western Personal Computing Show**, sponsored by *Personal Computing* magazine, Contact: Personal Computing, 401 Louisiana SE, Suite 6, Albuquerque, NM 87108.

March 20-23, New York — **Bank Administration Institute's Corporate-to-Corporate Electronic Funds Transfer System Conference**, Contact: Wayne B. Lewin, P.O. Box 500, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

March 21-22, London — **First Joint European/U.S. Software Management Conference**, Contact: AIAA Conferences, 444 W. Ocean Blvd., Suite 1403, Long Beach, Calif. 90802.

March 22-25, Toulouse, France — **Medical Data Processing Symposium**, Contact: IRIA, Secretariat des Journees, Service des Relations Exterieurs, Domaine

de Voluceau, Rocquencourt, B.P. 105, 78150 Le Chesnay, France.

Feb. 27-March 2, Denver — **1977 Western Regional Bank Card Management Workshop**, sponsored by the American Banker's Association, Contact: Andrew Ernst, assistant director, Bank Card Division, American Bankers Association, 1120 Connecticut Ave., N.W., Washington, D.C. 20036.

Data Conversion

Later, the data will be entered into a Hewlett-Packard Co. minicomputer and Control Data Corp. 6600 and 7600 systems at the National Center for Atmospheric Research (Ncar) in Boulder, Colo.

It will then be converted into rates of trace element run-off, rates of the surface source of pollution and the percentage of Chicago-

Say When.

Introducing the Consul 520. Now you can get exactly what you need in teletypewriter compatible equipment. Without paying for what you don't need. Check the features below and say when.

Let's say you need:

- ☐ Inquiry-response capabilities.
- ☐ Remote controls to X-Y address or position the cursor up, down, forward, backward and home.
- ☐ Audible alarm and keyboard lockout.
- ☐ 12" screen; 24 lines with 80 character positions per line.
- ☐ Dark lettering on light background for increased legibility.
- ☐ Bonded faceplate TV monitor.
- ☐ Five transmission rates, switch selectable.
- ☐ Scrolled or wraparound display.
- ☐ Automatic line feed button.
- ☐ EIA RS232 or 20 milliampere current loop.
- ☐ Video output.
- ☐ Full-duplex or half-duplex transmission.

It's the Consul 520. The meat-and-potatoes basic that's pure prime quality. It features as standard what most terminals call options. Single unit price, \$1595.



Maybe you need all the above features, plus:

- ☐ Hard-copy capability with printer interface.
- ☐ Cursor control keys.
- ☐ Numeric pad.
- ☐ Rack-mounting option.

It's the Consul 580. Like all our terminals, the 580 has an extended warranty option, and OEM/Educational discounts. Single unit price, \$1795.



LEASE
3277's
3-4 YEARS
COMDISCO
9701 W. HIGGINS RD.
ROSEMONT, ILL. 60018
(312) 698-3000

Cuts Typing, Printing, Proofing Time

Drafting System Gets Bills to N.Y. Legislature Faster

By Esther Surden
Of the CW Staff

ALBANY, N.Y. — A law-drafting system is helping members of the state Legislature here dig their way through the avalanche of 30,000 bills expected to be introduced this session.

The system has already been credited with cutting retyping, reprinting and reproofing costs as well as reducing the turnaround time between a bill's introduction and its printing.

The drafting system, which was under development for close to three years, is under the direction of the bipartisan, bicameral Legislative Bill Drafting Commission. It is run on an IBM 370/158 at the Office of General Services using two software packages from IBM: the Advanced Text Management System (ATMS) and the

Storage and Information Retrieval System (Stairs), according to Donald J. O'Brien, director of information systems.

The manual system is still used to a point, O'Brien explained. When a legislator decides to offer a bill, a bill-drafting attorney is consulted to determine which section of the law or laws should be changed. The attorney manually annotates the section of law to be amended, writing in the new material or deleting the part to be repealed, and gives it to the commission's technical group.

The technical group verifies that the proper citation was made and that the most recent amendment to the law was included.

After the verification procedure, the bill is sent to the computerized operation. An operator calls up the original law on an IBM 3277 from data stored on the 158.

Using ATMS commands, the operator indicates the parts of the law to be repealed or amended. After this phase is completed, a hard copy is printed on an IBM 3775.

The hard copy is given to the bill's sponsor with the material to be repealed overstruck and added material underscored, O'Brien explained. If the bill meets the legislator's approval, it is introduced.

Printing Procedure

An introduced bill gets a number, date and initial committee reference. After this information is added, the operator transmits the document to a queue. It is passed through some programs which have the function and command codes to drive a photocomposition machine.

The output of this is impact printer proof

copy and punched paper tape.

The paper tape is sent to the printer, where the overstruck material is arranged in bold brackets to indicate it is to be repealed; the new items are set in italics.

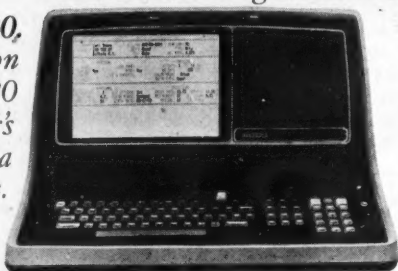
"The reaction from the legislators has been very favorable," O'Brien stated, "and one of the reasons is that we've cut down the amount of time from the point at which the legislator has a concept of the bill he wants to introduce until we get that bill back and into committee. It used to run more than one calendar week; we can now get it back within a calendar week."

Savings have been noted in the photocomposition area as well as in proofreading. "Just the savings that we make is not having to reproof everything" is quite a bit, he indicated. Now, every time another draft goes through, only the changes must be proofed, he said.

Moving right along, we drop the printer interface, and give you the above, plus:

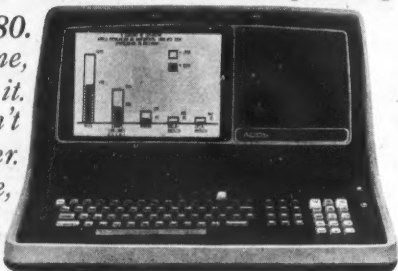
- ☐ Protected formats.
- ☐ Block transmission to cut down on CPU functions and considerably reduce software needs.
- ☐ Selective transmission of only variable data.
- ☐ Upper and lower case ASCII display.
- ☐ Shift and lock keys.
- ☐ Transmission by page, partial page, line or character.
- ☐ Look-ahead cursor positioning to suppress trailing blanks.
- ☐ Automatic tabbing between fields.
- ☐ Half-intensity.
- ☐ Blinking at two rates.
- ☐ Remote recognition of cursor position.

*It's the Consul 920.
With its sophistication
and flexibility, the 920
is a network designer's
dream. Without a
nightmare price.
Single unit price,
\$2200.*



- Still with us? Then you need the works:
- ☐ Graphics that show everything from bar charts to diagrams.
 - ☐ Alphanumeric annotation of graphics.
 - ☐ Line insert or delete; remote or local.
 - ☐ Character insert or delete.
 - ☐ Overwriting.
 - ☐ Parallel and serial peripheral interfaces.
 - ☐ Remote or local printing.

*It's the Consul 980.
Top of the line,
and acts like it.
You simply can't
buy better.
Single unit price,
\$2800.*



Now, If you've said when, we'll say where:
Applied Digital Data Systems Inc., 100 Marcus Blvd.,
Hauppauge, New York 11787 (516) 231-5400

ADDS

Program Eases Work In Class Action Suits

CHICAGO — Businesses, unions and state and local governments may be able to avoid lengthy and involved trials in class action discrimination suits by using the computer services of Equal Employment Opportunity Consultants, Inc. (EEOCI).

The firm's computer program, called the Avert Litigation Program (ALP), assists clients and their legal advisers in compiling statistical employment background during pretrial litigation.

Using an IBM 360/65 batch-oriented system with Cobol, the past and present employment practices and personnel records of the organization involved are gathered and assessed according to federal, state and local laws.

The EEOCI computer is used to determine whether discrimination did occur and then to calculate the actual cost of the violation to the company.

EEOCI's first step is to evaluate the circumstances and decide on the defense. The perpetual history system is programmed to meet certain standard attacks the Federal Government usually takes on a class action case, according to Judith Sodini, EEOCI president.

The computer is programmed to determine how far back to investigate; statistics on past and present employees are then compiled.

The program includes 37,000 instructions that aid in identifying certain problem areas and pointing out the necessary implementations.

Almost every kind of employment variable is included, Sodini said. Sex, age, the number of handicapped and disadvantaged on the staff and the salary and advancement policies are all correlated.

These statistics are analyzed in three separate ways: on a time-span basis, a "snapshot" or one-point-in-time basis and as a cumulative point in time.

Once discrimination has been determined, the system indicates what measures are needed to rectify the problem and how long it will take to implement them. It can also assess the dollar liability the organization will be facing.

Systems Checklists

350 pages of the most current and complete guidance for Systems Analysts. Checklists and techniques for every phase of systems constructions. \$20 postpaid; \$25 invoiced against P.O. Add \$3 First Class Postage.

THE NEW DIVISION
Box 913
North Chelmsford, MA 01863

Editorial

Legal Changes Needed

The recent settlement between IBM and Sanders Associates, Inc. was more than merely an agreement to drop Sanders' antitrust charges against IBM without either party admitting guilt [CW, Jan. 31].

It is one of the first times IBM has agreed to draw on the technology developed by a competitor for future inclusion in IBM products.

Those close to the situation said certain members of the Sanders legal team did not want to see their significant display technology abandoned.

IBM presumably agreed that potential product benefits to future IBM offerings were probable. Neither party will be specific on what these future products might be.

All this is more significant in light of the sale of Sanders Data Systems to Harris Corp. And it may mean that Sanders will not totally leave the commercial DP area. But exact details remain to be seen.

The unfortunate side of the agreement stems from a common industry opinion that Sanders had one of the best chances to prove predatory marketing practices by IBM because its case revolved around the relatively narrow IBM CRT terminal area.

Once before, IBM had made a concession to Sanders. In that case, IBM agreed to continue certain 2260 software support after Sanders complained its customers would be severely affected.

In this regard, IBM continues to settle antitrust suits out of court, thereby avoiding the legal test of its actions. While such settlements may be good business strategy for IBM and its competitors, who often need the money, it also points up a basic failing of the legal system.

As they are presently written and administered by the courts, the antitrust laws are not finding legal solutions to potential antitrust situations. These laws are being used as a vehicle for companies to arrive at outside settlements.

In the long run, competition is being reduced and predatory actions go unproven with these settlements. It is encouraging that IBM and Sanders also reached a business agreement that may keep alive some unspecified DP capabilities.

But the antitrust laws are not pointing the finger at abuses after due process. The legal intent of these statutes is being circumvented.

Perhaps some changes by Congress or the courts are in order.



"When They Asked for IBM Experience, How'd I Know They Meant on the Board of Directors?"

Letters to the Editor

DPers Who Forego Vacations May Be Involved in DP Fraud

Miles Benson fantasized that his programmer friends have been trapped into working without vacations by the impossibly tight schedules set by the company ["Why Would a DPer Ever Give Up His Vacation Rights?" CW, Jan. 24].

Couldn't it also be fantasized that Clifford, Brian and Sam are involved in an inside fraud which requires them to be on hand at all times to correct code? If the fraud is being perpetrated through the software, the programmer must keep others from stumbling upon the fraud by looking at his code.

Data Past

Five Years Ago
Feb. 9, 1972

NEWTON, Mass. — A *Computerworld* random survey of DP budgets of firms listed among the top 100 computer users in the country concluded that major computer users would continue or expand the cost-cutting measures learned during tight budgetary times.

Of those surveyed, 75% reported their budgets would either remain the same or increase, in sharp contrast to the past two years, when surveys of the same group showed decreasing DP expenditures by major corporations.

SACRAMENTO, Calif. — The state Board of Equalization considered taxes on software and services which, if they became law, would provide a "model for the nation," sources predicted.

The board proposed "the taxing of software as tangible property," and hearings were conducted here to establish firm guidelines, an official said.

Eight Years Ago
Feb. 12, 1969

LOS ANGELES — The U.S. Patent Office granted a second software patent despite guidelines which stated computer programs could not be patented.

The patent went to David E. Ferguson, president of Programmatic, Inc., for a method of increasing the usefulness of computer operation codes.

While the Patent Office granted the patent on the basis that the invention included both software and hardware embodiments, Ferguson contended the patent covered the implementation of his invention by any hardware or by any program.

WASHINGTON, D.C. — The Federal Communications Commission (FCC) permitted users to share their leased telephone lines and the cost of them — with other users.

A good audit should always check out the source code. This is especially important if certain programmers are protecting it at great personal expense under the guise of hard work and dedication.

John H. Davenport

York, Pa.

Suspicion Surrounds Workhorses

Miles Benson claimed that some companies may overload work schedules to the point of forcing a de facto no-vacation system.

However, the major point that should have been brought up that is fundamental to auditing principles, whether in a DP situation or not, is that companies should consistently force employees to take time off for vacations as well as participate in job rotation.

A vast number of cases of fraud were uncovered only when a new or temporary employee assumed the duties of a vacationing employee.

From an auditing standpoint, the worker who never has time to leave his job for even a little while creates a most suspicious situation.

William A. Newman

Reno, Nev.

Vacations Disrupt Fraud Plot

Miles Benson overlooked two significant reasons why a DPer would ever give up his vacation rights.

First, if one or more of these DPer were involved in perpetrating a computer crime, the absence could jeopardize the continuity of the crime. Secondly, no function should be so sacrosanct that it could not be performed by an alternate (backup) for a week.

The company's auditors or management in general should require every person to take vacation.

Michael I. Sobol

Boston, Mass.

Lord Theory Fallacious

I'm reasonably sure Kenniston W. Lord Jr.'s remarks were overdrawn and exaggerated ["Must FAA System Standards Be Purchased With Blood?" CW, Jan. 10].

As a pilot who uses the Federal Aviation Administration's (FAA) air traffic control (ATC) system all the time, I was instinctively sure I wasn't being jeopardized as wildly and irresponsibly as Lord alleged.

After a brief check, I'm still of that mind. The FAA's automated ATC system has ample redundancy built into it. If the entire system breaks down, the original controllers can and do revert instantly to the old original tried-and-true manual system.

In my opinion, the Lord theory that 3,600,000 lives are in jeopardy was deliberately fallacious.

Max Karant

Washington, D.C.

(Other letters on Page 16.)

In Quest of Harmony

Training for Executives Can Solve DP's No. 1 Problem

By Jack Stone

Special to Computerworld

An attendee at one of my recent workshops on computer center management rather silenced the class when he asked: "What problem do you believe is the most significant one facing center management today?"

As I thought through to my answer, I decided to choose the one which I believe has contributed most to the typical operation-by-crisis and yet has had the least attention paid to it. So I identified the problem as the conflicting relationships that so often exist between the top executives and the DP management.

These relationships, variously termed "communications," "mutual understanding," "cultural harmony," "human miscibility," "synergy" or just plain "sympatico," have seemed to deteriorate over the years in some inverse way with respect to the size of the mainframe complex (not too dissimilar, I might add, to my perceptions of the user satisfaction and value/cost benefit curves).

In most installations, top executives and DP managers continue to have great difficulty "getting it all together," and I sense that the problem is getting worse.

The situation can be summarized by the typical executive's viewpoint — "Those computer people just don't understand the business" — and the typical DP manager's viewpoint — "Those executives just don't understand the technology." Although I believe there is much truth in these assessments, the situation cannot be fully understood or addressed on such simplistic grounds.

The interaction between these two groups is organization- and personality-dependent

and, therefore, to effect improvements in the operating effectiveness of executive/DP management teams, one must carefully analyze each particular situation as a unique one.

Approaches to Harmony

There are many approaches that can be taken to help restore harmony and understanding in the front office. All of them take a great deal of time, energy, patience and creative communications for proper treatment.

The Human Connection

Only one approach has been used to any consistent degree in the past, and that has been basic DP technology training for the executives and basic business training for the DP managers.

DP training for the executive has, for the most part, consisted of brief seminars at hardware vendor locations which cover elementary concepts of hardware, software and industry-oriented applications, although the newer crops of young executives receive a more extensive grounding as part of their formal education.

While this technical background is useful in providing conceptual understanding of the systems development process and helps greatly with the terminology, it has to be viewed as a faltering first step along the long road toward that far-away goal of truly effective executive decision making in the fourth-generation environment.

With respect to basic business training for the DP manager, only a minuscule segment of the DP management population has had

formal business training, and just a few more have had access to professional development business seminars. Perhaps a handful of American business and non-military government organizations insist that a person serve long tours in functional departments before being initially considered for the position of DP manager (such duty is routine in the military departments).

Some courageous DP managers, recognizing the strained relationships with their superiors, initiated DP training programs

lacking the knowledge and experience to identify, solve and resolve the complex and unexpected problems that somehow seem to occupy them during most of the workday. For the executive, these problems are related to DP management; for the operator, technology management.

Both are busy, so busy that the daily pressures do not allow them to get or take the time off to receive the necessary training.

Second, the training program should be designed to be consistent with the executive's operating style. The successful executive is one who has an almost uncanny ability to grasp the essence of a business problem in very short order, evaluate the alternatives quickly and reach a decision promptly.

For what I believe has to be done, the training program should therefore be workshop-oriented so the content of the material is of immediate interest, the technical and management principles involved are concisely and simply presented by an expert communicator and the executive/student addresses and solves a set of problems which are directly relevant to current DP operations.

In my next column, I will discuss a case study which illustrates this approach to executive DP training.

A copy of the second of my curriculum guidelines, "Considerations in Effective Training of the DP Executive," is available upon request on company letterhead with an enclosed self-addressed stamped No. 10 envelope.

Readers are invited to send letters to be answered in this column on management and human relations issues in the DP setting. Address letters to Stone, Suite 222, 2233 Wisconsin Ave., N.W., Washington, D.C. 20007.

Looking at Smaller Items

Memos From a Mixed Mail Bag Feed Future Columns

One of the delights of writing a column like this is receiving readers' letters. They are a varied lot to be sure. Sometimes a single letter will later result in a full article or even a series of articles.

Sometimes the letters are detailed — like a three-page study of the actual user relationships with data base builders and with other interests, such as auditors and marketers which came in last week from Laurel, Md.

It was sent by Maryle Ashley and, despite its length, it contains only a quick overview of her thinking on the matter. But before this becomes an article, I shall have to talk to her quite extensively — and I shall do so.

But not only long letters get article treatment. Sometimes people get to the point in a few lines. A neighbor of Ashley, Herbert Bright of Bethesda, Md., only took five lines to make his point, which follows:

"In your column you have frequently discussed various forms of data transformation for such limited purposes as checking data entry. I suggest that you broaden your coverage of this topic... To support improved protection from unauthorized modification (accidental or purposeful) of data and programs is worth the attention of your readers."

He is right, of course, but whether I have anything worth saying on the topic will have to be investigated before I write a column on this area. So wait and see.

Despite these examples from this week's mail, not all the letters really bring up

enough to fill a column. Kreigh Tomaszewski, for instance, sent a *Psychology Today* questionnaire which tells "Mr. K.E. Tomaszewski" that he has been selected by a computer — and then asks him what sex he is.

John Rockwell sent in a *Harvard Business Review* letter addressed "Dear J. Assoc" — the computer having treated a shortened form of his firm's name as a personal name ("J.A. Rockwell Assoc").

Al Bergquist didn't send anything in; he just asked for an explanation about an earlier column and, in particular, the difference between data base and nondata base situations.

All typical points on people's minds, yet not really enough to carry a complete column. So, the question is how do I respond to them, particularly when they raise real points.

More Labels

A particular piece of mail received this week is a prime example of something that needs to be said, but which takes well under a column to say. It came from Alan B. Wolfson of Coral Springs, Fla. He sent in mailing labels with the word ZIP in the numeric fields at the top — which didn't represent Wolfson's Zip Code.

Perhaps Wolfson is right about the reason for *Computerworld* delays; perhaps he is wrong. I really don't know, but it is certainly true that there are problems with associating well-known terms like ZIP with facially similar fields. And that is the computer user problem discussed in this column. But a full column? Enough said already.

So goes the mail — from Buenos Aires to Saginaw, from Stockholm to Brookline; it is useful and welcome. For article matters, there are articles; for others, there are oc-

casional summary mentions like this.

Some of the mail tells of DPer's struggles to cope with the outside while keeping their own respect for themselves. John sent in such a letter just yesterday.

An ex-scientific programmer, John has been DP manager for a medium corporation for the past few years and has steered it through a couple of hardware changes. But now things seem stymied. He wants to go on-line, but management is apathetic.

Success Story

John had spoken to me a couple of times — telling his story and wondering about a solution. Now he wrote it down, telling a quiet success story of fewer and fewer breakdowns of hardware or software, so management now takes his success for granted and no longer has time for his hopes.

Not an unusual story, in fact, except he had not looked at it as being a success story until he wrote it all down. Then, when he had written it, he added a P.S.:

"I don't know what you can see from reading this. But on rereading, I can see the way ahead. I'll train up my programmers and analysts to think on-line and to become proficient with it."

Again — is this worth a whole column? A man beginning to recognize himself as a success, even though he isn't being allowed to have his head at the moment?

The situation is common enough in DP where all of us have had to pioneer in our early days to an almost unprecedented extent. As the field has matured, such pioneering is no longer everyday work, and many of us think nostalgically of the old days.

But that does not make our situation, no matter how changed, a failure. Nor does it free us from the responsibility to see to the

training and preparation of those we still lead.

John is now on the way to becoming a second success — as a trainer — and that is great. Yet, second and third successes are too common in this field to be a story.

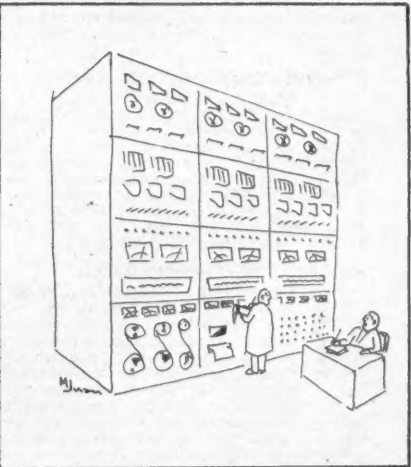
So goes the mail — from Buenos Aires talking about its airline systems to Stockholm on check digits, from Brookline on operating systems flaws to Saginaw on microsoftware. And from some, a few articles; from others, occasional mentions like this column.

But, in any event, please keep them coming, for they are the way things are in DP. Thank you all.

© Copyright 1977 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.

The Taylor Report

By Alan Taylor, CDP



"What's 7 Times 8?"



dearborn
computer
leasing company

Just one of the many leading companies you'll see at

COMPUTER
EXPO 77

DOS/RS... More For Your Money!

Software that lets you get more from existing equipment. For instance... better organization of function for improved throughput... 6 partitions... full program relocatability... total component support... core image compression of 40%.

Organized by:

COMPUTER
CARAVAN
77

The national computer exposition that's coming to you.
797 Washington Street, Newton, MA 02160
(617) 965-5800.

San Francisco • Los Angeles • Cleveland • Minneapolis/St. Paul
Chicago • New York • Philadelphia • Washington, D.C. • Boston. Starts March 29th.

Commentary on Hiring Marred By Misconception of Technology

By Dale N. Saville

Special to Computerworld

Andrew Robinson's commentary on DP hiring practices [CW, Jan. 24] had as its central conclusion that "hiring practices in the DP industry have not kept pace with DP technology."

In my opinion, this conclusion was based on a misunderstanding of personnel practices and DP technology.

Personnel practices are aimed at attracting and retaining qualified people to perform necessary work at a fair market price. Retention of personnel is important in all industries since the effect of "years of experience" is multiplied by having that experience tuned to the specific personalities involved in performing the necessary work.

Most companies have a written policy to develop personnel within the company to

fill vacancies and only hire outside applicants during a growth period or when a specific skill is not available within the company. Many companies, by written policy, select the inside applicant over the outside

Reader Commentary

applicant, all other qualifications being equal.

If both applicants are deficient in one qualification, not necessarily the same one, then the nod will usually go to the inside applicant because he is already familiar with the company's general operations and, to some extent, because company management wants to show it is "loyal to those who are loyal to the company."

Another aspect of personnel practices that is difficult for many people to accept is that ultimately all jobs have a ceiling salary. At some point the incremental performance improvement from additional work experience levels off and may even decline.

Few managers are willing to pay more for a person whose additional experience is not reflected by a highly visible increase in productivity. Nor is a manager going to pay more for a person whose skills are not more critical to the company than another set of skills.

I believe Robinson's misunderstanding about the "pace of DP technology" was not so much a concern with the pace, but with the direction. Somewhat oversimplified, the purpose of a computer operator is to be the arms and legs of the computer... mount tape reels on a specific device, load paper into a printer, etc.

The primary purpose of operating system development has been to automate those decision functions formerly performed by the operator. Operating system components for such things as memory management, CPU time management, I/O device allocation, job scheduling and program failure handling were formerly operator duties.

The whole history of computer system development centers around the systematic elimination and expediting of the operational decision functions concerning the hardware and, wherever practical, the elimination of mechanical functions.

Robinson concluded by remarking "To say that our profession is too new to have dynamic and equitable personnel practices... is... illogical." Again, I think this was a misunderstanding of the actual practices of the DP industry.

Dynamic practices are productive activities that are changing. I think the DP industry has passed this test by creating a multibillion-dollar industry employing thousands of people using skills that did not exist 25 years ago.

Equitable practices are those impartial activities that override rigid laws. The fierce bidding for skilled personnel has moved most DP job salaries to levels that far exceed other occupational salary ranges tied to the cost-of-living indexes.

In my opinion, the inequities do not exist between job families, but between male and female salaries within a job family.

Having spent several years as an undergraduate computer operator, I appreciate Robinson's enjoyment of his current job; however, he overstated his dilemma. The role of the computer operator is being reduced and applications programming is currently a critical activity, hence paid substantially more than computer operations.

Everyone would like "to do their own thing" and be paid top dollar; however, that is not the way large economic systems are put together. In Robinson's words, "It is about as illogical as our persistence in supporting second-generation keypunch cards on fourth-generation systems."

✓ Check what \$12 can buy!

Unbiased Datapro reports on EDP products. Characteristics, prices, users' ratings, comparisons, and much more.

Revised and expanded reports that include many new systems and models for 1977

All About 228 Small Business Computers. Report M11-050-201.

This comprehensive report is designed to help you select and apply low-cost business data processing systems. The characteristics and prices of 228 current systems from 96 vendors are reported in detailed comparison charts, and the experience of hundreds of small business computer users is analyzed. Selected from Datapro 70. \$12.

All About 186 Minicomputers. Report M11-050-101.

This comprehensive report is designed to aid you in understanding the rapidly proliferating minicomputers and selecting the one that can best satisfy your requirements. You'll find detailed comparison charts covering the characteristics of 186 current minicomputers from 69 manufacturers, as well as users' experiences with thousands of minicomputers. Selected from Datapro 70. \$12.

All About 125 Microcomputers. Report M09-050-201.

This 32-page report features detailed comparison charts that describe characteristics and pricing of 125 current microcomputers from 67 vendors, plus new information on development systems and kits. Selected from Datapro Reports on Minicomputers. \$12.

All About 55 Microprocessors. Report M09-050-101.

This completely revised, 18-page report details characteristics of 55 current microprocessors from 27 manufacturers. You'll also find straightforward guidelines to help you understand and apply these compact, low-cost CPUs. Selected from Datapro Reports on Minicomputers. \$12.

User Ratings of 250 Proprietary Software Packages. Report 70E-010-40.

This 22-page report contains the results of Datapro's fourth annual survey of proprietary software users, conducted in cooperation with Datamation. You'll find extensive tables showing how thousands of users rated 250 individual packages, plus financial insights and the 1976 Software Honor Roll. Selected from Datapro 70. \$12.

A Buyer's Guide to Data Base Management Systems. Report 70E-010-61.

This 32-page report presents useful guidelines to aid you in preparing, evaluating and selecting a data base management system. It compares the key characteristics of major systems and provides an in-depth evaluation of these systems: ADABAS, IDMS, IMS, SYSTEM 2000, and TOTAL. Selected from Datapro 70. \$12.

All About 109 Remote Batch Terminals. Report 70D-010-25.

The path to high-volume transmission and reception of data at locations remote from your computer center is a confusing one. This 35-page comprehensive report provides detailed specifications of 109 remote batch terminals from 43 vendors, presents the results of an extensive user survey covering more than 1,700 installed terminals, and offers practical guidelines for selecting a batch terminal that will meet your specific needs. Selected from Datapro 70. \$12.

All About 182 Alphanumeric Display Terminals. Report 70D-010-20.

This comprehensive 54-page report provides detailed specifications of 182 alphanumeric display terminals from 73 vendors, presents the results of an extensive user survey covering more than 14,000 installed terminals, and offers practical guidelines for selecting a display terminal that will meet your specific needs. Selected from Datapro 70. \$12.

All About Data Communications Facilities. Report 70G-100-01.

This unique 26-page report summarizes the communications facilities and rate structures of AT&T, Western Union, and the currently active microwave and satellite carriers. You'll also find the results of a survey of user experience with about 10,000 communications links, plus guidance in selecting the facilities that will most effectively satisfy your needs. Selected from Datapro 70. \$12.

All About 100 Remote Computing Services. Report 70G-900-01.

This comprehensive 41-page report explains both interactive time-sharing and remote batch processing, discusses their advantages and drawbacks, summarizes the services offered by 100 remote computing companies, tells how users rate the leading companies, and provides guidelines for selecting a suitable supplier and getting started. Selected from Datapro 70. \$12.

All About 146 Minicomputer Disk Storage Units. Report M13-100-201.

This 54-page report provides minicomputer users and suppliers with a comprehensive survey of 146 disk storage units. The comparison charts describe the current product lines of 47 suppliers, and the accompanying text offers the reader an enlightening guide for evaluating disk and drum storage performance. Selected from Datapro Reports on Minicomputers. \$12.

All About 149 Teleprinter Terminals. Report 70D-010-21.

This 42-page report provides detailed specifications of 149 teleprinter-style communications terminals from 57 vendors, presents the results of an extensive user survey covering more than 11,000 installed terminals, and provides guidance in selecting the most suitable terminals for your needs. Selected from Datapro 70. \$12.

All About 300 Modems. Report 70G-500-01.

Data communications users can select from an overwhelming variety of modems offered by dozens of independent vendors and by the telephone companies. This in-depth, 48-page report summarizes the characteristics of more than 300 current modems from 43 suppliers, provides useful selection guidance, and includes a unique survey of users' experience with over 15,500 modems. Selected from Datapro 70. \$12.

All About Automatic Typing and Text Editing Systems. Report S13-050-101.

This comprehensive 50-page survey summarizes the characteristics of over 100 models of automatic typing and text editing systems from 60 vendors. Detailed comparison charts describe each model's basic configuration, pricing, storage medium and capacity, editing features, printer characteristics and much more. Selected from Datapro Reports on Office Systems. \$12.

Directory of 850 Suppliers. Report 70H-100-101.

This 174-page directory contains informative profiles of 850 companies that offer EDP products and services of all types, plus guidelines for interpreting the information and selecting qualified suppliers. You'll find entries describing each company's location, size, executives, financial status, ownership, sales and service organization, and product line. Selected from Datapro 70. Special price: \$15.

Please send me the Datapro reports which I have checked by number below.

☐ Enclosed is \$_____. ☐ Bill me for \$_____, adding \$2 handling.

- ☐ M09-050-101
- ☐ M09-050-201
- ☐ M11-050-101
- ☐ M11-050-201
- ☐ M13-100-201
- ☐ 70D-010-20
- ☐ 70D-010-21
- ☐ 70D-010-25
- ☐ 70E-010-40
- ☐ 70E-010-61
- ☐ 70G-100-01
- ☐ 70G-500-01
- ☐ 70G-900-01
- ☐ 70H-100-101
- ☐ S13-050-101

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

CWO

For those who value information.

datapro

Datapro Research Corporation □ 1805 Underwood Blvd □ Delran, NJ 08075 □ 609/764-0100



Duplicate Names Cause Problems

Wrong Credit Data Menaces Reader's Loan Request

The following letters were provided by a West Coast reader. His problem with TRW Credit Data, which he said has been going on for about three years, flared up again recently when he attempted to obtain a loan to finance a new home. His name has been omitted to ensure his privacy.

Dec. 9, 1976

Mr. Edward Brennan Jr.
TRW Credit Data
100 Ocean Gate
Long Beach, Calif. 90802

Dear Mr. Brennan:

My name is John Doe of 9999 Chestnut St., San Francisco, Calif., Social Security No. 999-99-9999.

On Tuesday, Dec. 7, 1976, at 11 a.m., I received a telephone call from Great Western Savings & Loan in San Rafael, Calif., which informed me that credit information received through TRW Credit Data makes me a bad risk for a home loan.

Most of the "bad accounts" were in 1974 and 1975. Several are for accounts where I have never had — or applied for — for credit. Examples are BankAmericard, TWA Air Travel, Macy's, etc.

Mr. Brennan, this is not the first time this has happened! It has been going on for over three years for one reason and one reason only. TRW Credit Data has incorrect information in its data base file on me.

I visited your offices at 100 Mission St., San Francisco, on Dec. 31, 1975, to solve this problem once and for all. I met with one of your counselors only to learn that my credit record as far as TRW Credit Data was concerned was fine.

Now, here we go again! On Tuesday, Dec. 7, 1976, at 1:45 p.m., I met with Daisy Mendoza, supervisor of TRW Credit Data in your San Francisco office. I explained to her the problem.

Let me explain it to you, Mr. Brennan. There are two John Does living in San Francisco. TRW Credit Data and its employees have been confusing those two files for over three years and I am upset, mad, confused and ready to go to the limit.

TRW Credit Data is selling credit information on me, apparently without taking any reasonable measures to ensure that you have correct credit information. I have no idea how you obtained my address unless you used the telephone book.

If you did use the telephone book, you are undoubtedly aware that there are a number of John Does in San Francisco.

Mr. Brennan, in my attorney's opinion such practices are misleading and unfair within the meaning of the California Business and Professions Code SS6947(j) and 17500 and in violation of the regulations of the California Bureau of Collection and Investigative Services, California Administrative Code SS620 and 627.

You are hereby placed on notice that if

TRW Credit Data continues giving wrong credit information on me to companies from which I am attempting to receive

Reader Commentary

credit, loans, etc., I will pursue the administrative and legal remedies available to me, including the lodging of a formal complaint against you as well as TRW Credit Data with the California Department of Consumer Affairs.

I would appreciate your prompt attention to this matter and an acknowledgment that TRW Credit Data did indeed give wrong credit information on me to Great Western Savings & Loan. I also want a letter of cor-

rection to go to Great Western.

The obligation rests with you and TRW Credit Data to make certain your credit records on me are correct and you are giving correct information when a request is made.

Very truly yours,
John Doe

Brennan responds:

Dec. 20, 1976

Mr. John Doe
9999 Chestnut St.
San Francisco, Calif.

Dear Mr. Doe:

I have your letter of Dec. 9, 1976, and thank you for advising me of your concern regarding your credit file.

Since receiving your letter I have been in touch with both the San Francisco consumer relations office of TRW Credit Data

and the National Consumer Relations Office in Anaheim.

I have been advised that subsequent to your visit to the San Francisco office the necessary steps were immediately taken to adjust your file. Please be assured that we are investigating the source of this particular incident in order that we can take appropriate measures to prevent a recurrence.

It is also my understanding that a copy of your corrected file was sent to you on Dec. 9, with a copy also being forwarded to Great Western Savings as you requested.

I sincerely regret any inconvenience you have sustained and thank you again for bringing this matter to my personal attention.

Yours very truly,
Edward J. Brennan Jr.
Vice President and General Manager

A New Antidote for "TSO Overload Blues."

Want to make an IBM salesman happy? Add TSO to your data processing environment. Before you know it, you'll be using so much mainframe capacity that there's nothing left in reserve. And then, Presto! Up you go to a larger CPU.

Braegen Has the Antidote. Now you can equip every Braegen Virtual Terminal System (VTS) with a program we call *TSO Editing*. It shifts 90% of the interactive TSO business from your mainframe to the VTS controller. And it takes at least half the total TSO load away from the host computer.

VTS Saves Money Two Ways. The first way you save money with VTS is when you use it in a 3270 configuration. Saves money over IBM's version, saves money in communications line costs, and saves money by giving

you multiple personality flexibility. The second way you save money is when you add TSO Editing. Now, for the price of the 3270 alone, you keep perking along with the same old CPU, in spite of the extra load imposed by TSO.

Heard About the DOS TSO? Just about the last place you'd expect to see a TSO environment is a System 360 installation running on DOS. Well, Braegen's VTS with TSO Editing provides a gangbuster TSO capability, and you'll love the way it functions.

TSO Is Only the Beginning. When you communicate with your CPU through a Braegen Virtual Terminal System, you'll save a lot more than just mainframe capacity. TSO Editing provides some remarkable text editing and word processing capabilities, and VTS versatility lets you run in multiple personalities, such as 1403/2501 and 3780 in addition to 3270 mode.

We Lease, Sell and Service. Braegen's VTS products are available for outright purchase, or lease, and are supported 24 hours a day, 7 days a week, in all major metropolitan areas. Get all the facts you need about VTS in general and TSO Editing in particular by contacting Larry Edwards, The Braegen Corporation, 20740 Valley Green Drive, Cupertino, California 95014. Telephone (408) 255-4200.



BRAEGEN



'Algol?'

NEWS RELEASE:
Now available from dearborn

A totally NEW 148 operating lease program

If you have a
370/148 2 MEG
on order prior to
July 1 delivery, call:

Chicago 312/671-4410
St. Louis 314/727-2777
Toronto 416/621-7060



**dearborn computer
leasing company**

hardware 360's/370's
systems software
brokerage

4849 n. scott st., schiller park, IL 60176
st. louis • toronto

Software in the can, can.

**How to get the benefits and avoid the bugs of applications
software-in Computerworld's February 28th special report.**

If you were the world's only computer user you couldn't avoid in-house development of all of your applications software. But when your task is common, the applications software you need has likely been developed already and is being used in many installations like your own. So your mundane task -- and many more exotic ones -- are commercially available and "in the can". All you need do is find the right package at the right price, modify it a little (or a lot) to meet your standards, and you've taken a sizeable shortcut toward computer performance.

The number of users who've chosen to acquire their applications software this way has grown rapidly, for a variety of reasons. And *Computerworld's* February 28th special report will explore these reasons -- and the results. Edited by Don Leavitt, the report will include tutorials on applications software and experts' opinions on selection criteria. User experiences with applications packages will be emphasized throughout, and the attitudes many many users hold toward modification, with and without vendor support, will be reviewed. Many timesharing networks now sell applications software as an adjunct to their services, and we'll take a look at the savings that are possible with this service. In all, you'll find a wealth of information on applications packages in the February 28th *Computerworld*. So if you're a DP manager, programmer, or someone who's concerned about the productivity and cost effectiveness of DP, don't miss it.

If you're in the business of developing and marketing software packages, advertise in this special report. You'll reach more of your key market. Your *Computerworld* salesman can fill you in on the details of *Computerworld's* high yield. Or call Judy Milford at (617) 965-5800 to place your ad.



COMPUTERWORLD

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(201) 461-2575

San Francisco
Bill Healey
Jim Richardson
(415) 495-0990

Los Angeles
Bill Healey
Jim Richardson
(213) 475-8486

Letters to The Editor

Managers Also Fantasize, But Viewpoints Differ

Miles Benson said he "fantasized" about possible reasons why programming personnel willingly give up unused vacation time and attributed some very unpleasant possibilities to the companies ["Why Would a DPer Ever Give Up His Vacation Rights?" CW, Jan. 24]. It seemed that these people were willing victims who were used by a "malevolent company."

What Benson fantasized may be true, but I don't really know any malevolent companies. However, let me fantasize a bit about reasons why some programmers willingly sacrifice their vacation time.

Before I do, please allow me to state that we do not let any employee lose his vacation time if he doesn't use it all in the year earned. We do, however, practically insist that everyone use their vacations in the year it is due. We all need a rest periodically and it is best to get away, have a rest and return to the battle with renewed vigor.

Anyway, back to my fantasizing:

- Could it be that the programmer is so ego involved in his work that no one else is allowed to touch it?
- Could it be that the programmer may be reluctant to let go of what he is doing and have it turned over to someone else while he is on vacation? Could the new programmer be better than he? Is he afraid to let anyone else see his work?
- Does the programmer think the boss will note this "devotion to duty" and suitably reward him with rapid promotions to the upper echelon? (This rarely happens. The boss really doesn't care if you use your vacations or not. He doesn't keep track of them at all.)
- Does it make the programmer "feel good" to be so needed that he just can't get away for even a day or two without emergency calls from the office? (When this happens, the boss generally concludes you are disorganized and can't delegate work to anyone else, so you won't be promoted to manage anyone else.)

So you see, managers can and do fantasize a bit now and then, the same as anyone else, but we do it from a different viewpoint. I have never seen or even heard about the type of malevolent company about which Benson fantasizes.

If I felt I was in an organization even remotely like Benson's fantasized company, I would run, not walk, to the nearest exit.

He may well be right, but I hope not. In any case, my fantasies should be given the same weight as his since we all know that they are not real -- or are they?

William A. Delaney
President

Analysis & Computer Systems, Inc.
Burlington, Mass.

Classic Sign of Fraud

There is one important thing about not taking a vacation that seems to have escaped Miles Benson.

One of the classic signs of possible involvement in a fraud or embezzlement attempt is a refusal by an employee to take all of his vacation.

Belden Menkus

Bergenfield, N.J.

Additional Facts Demanded

After reading Jack M. Wolfe's article ["Novice DP Majors Outscore Veteran DPers," CW, Jan. 10], I really wondered what our industry has become.

Here we are with 39% of our experienced people knowing less than our college graduates and yet still producing better software and hardware and processing more and more information daily.

Since I hope I am not included in this 39%, I guess I should ask for a raise since I am obviously carrying someone.

Wait. Did I say obviously? Wolfe said it was a "test validated by a U.S. government agency." As a reader of *Computerworld*, I feel I should ask for more information before I feel hurt that I am forced to work with such a large proportion of second-rate programmers.

What government agency validated the test? From past experience, several government agencies have validated reports, studies and surveys, later found to be inaccurate.

What type of questions were asked? If the questions dealt with a lot of theory, EAM, etc., many experienced programmers have not dealt with these subjects in years.

I don't mean to sound so antagonistic, but I feel that when writing an article, certain information should not be omitted. The readers are entitled to know as much about the investigation as they are about the results.

Martin B. Serkin

Freehold, N.J.

payroll limping?

Too many small programs . . . Too many read/writes of old fashioned segmented records . . . Too many discrepancies between redundant master files . . . Too many interface programs that don't interface . . . Too much thrashing of old fashioned code . . . Too many half-astute answers to today's EEO, OSHA and ERISA needs . . .

Sounds like you should discuss up-to-date Payroll/Personnel/ERISA software for your 360/370, Burroughs, Honeywell or Univac, with Joe Nestor (617) 851-4111, Wang Laboratories, Inc., Lowell, MA 01851. In California, call Carl Tarascio at (714) 631-0138.

WANG

COMPUTERWORLD



...the one
weekly newspaper
that's designed to fulfill your
unique "need to know"...
the one newspaper that can
give you all the current
information you need to benefit
you, your organization and
your career progress...
52 weeks of incisive news,
commentary and special
reports...subscribe today,
use the attached postage paid
order form.

- ☐ Please enter my subscription
(details on back)
- ☐ I'm already a subscriber,
but I'd like you to
change my:
- ☐ address
 - ☐ title
 - ☐ industry
 - ☐ other

My current mailing label is attached
and I've filled in new information
on the other side.

Put old label or label information here

RATES: U.S. - \$15 Canada and PUAS - \$23 Other foreign - \$40

If charge we must have cardholder's signature:

Signature: _____

Expiration Date: _____

--	--	--	--	--	--

[illegible]

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.



COMPUTERWORLD

BUSINESS INDUSTRY

10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other: _____

TITLE/OCCUPATION/FUNCTION

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/
Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other:

CIRCULATION DEPT. 797 Washington Street, Newton, Mass. 02160

Detach here, fold, and place in post-paid envelope attached through binding.

Now Packaged for Sale

Manufacturer Builds 'Pages' to Cut OS/VS Overhead

GREENSBORO, N.C. — Western Electric's Kansas City Works has developed and installed a Program Affinity Grouping and Evaluation System (Pages) to reduce OS/VS overhead.

The specific areas where overhead reductions occur are said to include: supervisor execution time; head movement and/or device-busy on the pageable Link Pack Area (LPA) page-data-set device; head movement and/or device-busy on the load library devices; channel-busy time; and total elapsed run time.

Pages defines for OS/VS, via a packing list, the optimum placement of modules within LPA, thus minimizing page fault occurrences caused by interprogram transfers of control between modules, a spokesman explained. It constructs the list by using a combination of module-affinity and module-activity analysis, with consideration given to OS/VS link pack loading constraints.

Reductions in wait-state time have also been effected by Pages in the area of load-library fetches, through a module-activity analysis technique which determines optimal module placement within load libraries.

Pages also generates reports which can be used to completely eliminate certain wait-state conditions. The reports identify those modules which should either be made resident in real storage or have their module

names included in the resident directory because of their extremely high activity, he said.

Hooks Program

Input to the system is normally via the Generalized Trace Facility (GTF) of OS/SVS or OS/MVS. OS/SVS installations may optionally use Pages' hooks program for gathering input data. The hooks program has less overhead than GTF since only module activity and affinity data needed by Pages is collected.

Pages also includes a simulator for comparing packing lists. Using trace data containing LPA activity collected from its production system and packing lists as input, Western Electric calculated average page faults per 100 calls to the LPA while varying the number of "concurrent in-memory pages per task," the spokesman said.

CONCURRENT IN-MEMORY PAGES PER TASK

Packing List Type	1		2		3		4	
	Page Faults	% of Increase	Page Faults	% of Increase	Page Faults	% of Increase	Page Faults	% of Increase
Pages	51.81	-	29.46	-	21.00	-	18.55	-
Activity	64.50	24	45.25	54	36.96	76	33.16	79
Default	83.79	62	65.74	123	54.62	160	50.69	173

The results of comparing a Pages-generated packing list, an activity packing list and the default list (the one that comes with OS/VS), using the Pages packing list as a base, are shown in the accompanying chart.

Source code — "Cobol with some Assembler subroutines" — is available un-

der perpetual license for a one-time fee of \$5,000, the spokesman noted.

That fee covers use of Pages throughout the user's first data center, regardless of how many CPUs are there, according to the spokesman at Western Electric's Patent Licensing Office, Guilford Center, P.O. Box 25000, Greensboro, N.C. 27420.

Software Key to Flexible Prime 500

FRAMINGHAM, Mass. — Software introduced by Prime Computer, Inc. for its model 500 CPU and the "Transact" configurations (see related story on Page 35), includes an operating system update, a formatting system for data entry and retrieval, a multiple index data access method (Midas) and a data base manage-

ment system (DBMS).

The updated, virtual memory-oriented Prime Operating System (Primos V) includes all the capabilities of earlier versions plus support for the 500's general register, 32-bit architecture.

Decimal arithmetic, character manipulation and character editing instructions are directly executed with a combination of hardware and firmware, the company said.

The Forms Management System (Forms) provides the means for defining how data fields are to be displayed upon or received from various device types and uses the definition at run time to control the data transfer, Prime added.

Forms can communicate with applications written in any mixture of the languages Prime supports including ANS Cobol '74, Fortran IV, RPG-II and Macro Assembler. In addition, users can alter any part of a Forms definition at run time to reflect current needs, a spokesman noted.

The Midas Touch

Another package, Midas, is a system for handling large files.

It facilitates the creation of files designed for quick access with minimal data redundancy. It supports concurrent manipulation by multiple users through as many as 20 entry points to the same data record, he said.

The entry points include a primary key and up to 19 secondary keys. As files are built, indices are separately established and maintained which optimize storage space and facilitates incremental, independent creation, modification or deletion of the keys.

Finally, the DBMS, described as "Cobol-compliant," has five major functional modules. There is a Data Definition Lan-

guage (DDL) translator for describing the data base and separate DDL translators for describing Cobol- and Fortran IV-dependent data base subsets.

Preprocessors for translating Data Manipulation Language (DML) into the appropriate Cobol or Fortran IV host language constructs are also part of Prime's DBMS, as are a reentrant DML command processor and an interactive Data Base Administrative Command processor.

The software is available under various plans. Midas, for example, is bundled.

Otherwise, the company is featuring "functionality packages" which provide various combinations of software depending largely on user memory size.

This packaging costs from \$8,000 to about \$25,000, he said from Prime's offices at 145 Pennsylvania Ave., Framingham, Mass. 01701.

Decision Systems Releases Directory on Finance Plans

TORONTO — The 28-page *Directory of Financial Planning Software* provides descriptions of packages developed for budgeting, financial and corporate planning applications now available from software houses or remote computing networks in the U.S. and Canada.

Published by Decision Systems, Inc., the directory summarizes and compares selected characteristics and facts about each package and provides data about the number of current users, date of first availability and names and addresses of vendors.

The \$25 directory can be ordered from Decision Systems, Inc., 2323 Yonge St., Suite 604, Toronto, Canada M4P 2C9.

National CSS Adds APL Support, Notes Possible Ties to DBMS

NORWALK, Conn. — Beginning next month, National CSS, Inc. (NCSS) will provide an extended version of APL on its remote-computing network.

APL/CSS, already in limited use by some NCSS clients, is said to be based on IBM's VS/APL. To that base, however, the network has added such features as a sophisticated formatting capability, interactive graphics and adjustable workspace, a spokeswoman explained.

Easy-to-use I/O procedures, file-sharing capabilities and a growing library of pre-programmed routines are also part of APL/CSS, she said.

Further, if direct user interaction isn't required, this implementation of APL can be operated in batch mode on a deferred processing option, she added.

APL/CSS has been interfaced with NCSS's Nomad data base management system so that users will be able to manipulate their data with the immediacy and precision provided by the unique APL instruction set, according to the spokeswoman.

The formatter controls the system's out-

put, providing the means of converting numeric data to character form, controlling column width and expressing numeric values in scientific notation. Users can also mix text with digits, use background text and work with symbol substitutions.

The language processor accommodates large amounts of data easily at any time, she said to allowing the user to expand his workspace to as much as 8M bytes. The minimum workspace in APL/CSS is 170,000 bytes, she added.

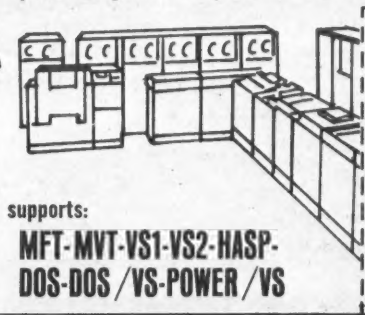
Users can work with files stored on magnetic tapes or disk drives at the network's computer centers. These files can be created by and later used by any language including APL, Fortran, Cobol or PL/I, she continued.

Through use of the library facilities, users can access routines by a single name, without knowing anything about APL.

This clearly makes the power of the language available to all users, even those who are not DP professionals, the firm noted from its headquarters at 542 Westport Ave., Norwalk, Conn. 06851.

**OVER 900 DP Managers
now use the
JOHNSON
JOB ACCOUNTING
REPORT SYSTEM**

- Accurate Job Accounting ■ Continuous Performance Measurement ■ Equitable Cost Distribution ■ Optimized Software Performance ■ Accurate Customer Billing
- Realistic Thruput Analysis ■ Optimum Resource Utilization



supports:
MFT-MVT-VS1-VS2-HASP-
DOS-DOS/VS-POWER/VS

JOHNSON SYSTEMS INC.

8400 Westpark Drive McLean, Virginia 22101

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

PHONE _____

COMPUTER _____

OPERATING SYSTEM _____

Send for
FREE
30 Page System
Characteristics
Manual



For those who'd rather travel light, The Xerox Executive Printout.

People accept big, clumsy, hard-to-read printouts because they think they have to. That's the way computers print, isn't it?

You know better. With a Xerox 1200 you can give them what they didn't know they could have—letter-size reports as easy to read as the text on this page.

The 1200 is a lot faster than your clattery old line printers. Works either on or off line.

Overlays let you print forms and data at the same time, so there's no

longer any need for preprinted forms.

Keep some line printers for yourself if you like, but give your reading public a surprise present:

Executive Printouts.

For information on the 1200 Computer Printing System, call (213) 679-4511, Ext. 2409, or write Xerox, Dept. A1-15, 701 Aviation Blvd., El Segundo, CA 90245.

XEROX

'Plan IV' Monitors MVS Sites

PHOENIX — The Plan IV computer system management aid package from Capex Corp. has been modified by the vendor to function in an MVS environment as well as under other versions of IBM's OS and its VS outgrowths.

Plan IV: MVS is capable of processing SMF, MF/I or RMF data to provide information needed for computer resource management, capacity planning and system tuning, Capex Corp. said.

The system's reports are "readable, understandable and comprehensive enough to support all levels of decision making," a spokesman claimed.

The package shows how the user's system has performed in the past, how it is currently performing and how it's likely to perform in the future, he said.

In addition to basic reporting, it provides "meaningful correlations and analyzed information" necessary for IPS tuning, service and workload distribu-

tion, page tuning, channel balancing and device loading, the company said.

Comparisons are made between previous and current experiences, providing immediate indications of improvement or degradation in the use of system resources, according to the spokesman. Probable trends are shown, projecting workload and system performance for the next six months.

With that type of information, the user can detect the need for changes in equipment, scheduling, system performance or even individual programs; the reports can be produced at user-selected intervals so the impact of changes can be studied promptly, Capex said.

Plan IV:MVS is available for a one-time license fee of \$9,800; it can also be leased for \$475- to \$540/mo depending on lease duration, the company said from 2613 N. Third St., Phoenix, Ariz. 85004.

File Maintenance Programming Added to 'Misam' for PDP-11s

MONTREAL — The Multiple Index Sequential Access Method (Misam), introduced last year for use on Digital Equipment Corp. PDP-11s under RSTS/E [CW, May 3], has been enhanced with the addition of a file maintenance system, according to its vendor, Info-Boutique Ltd.

The package was originally developed to allow multikey file accesses, capabilities not available with DEC's IAM and Isam software. The techniques used in Misam also reduce the number of words appended to each program by DEC's access methods, an Info-Boutique spokesman claimed.

The file maintenance support now built into Misam-II allows the user to build a file creation, enquiry or deletion program in as few as 15 minutes, he said. That estimate includes time to update Misam keys, but the system will also work for files indexed by

logical record number, he added.

Also added to the package was a series of new commands, including one that allows the user to "kill" a complete index on-line and another that allows access to data records through use of a partial key. Support for a block access sequential facility is said to be three times faster than normal Access Sequential, the company claimed.

A utility within Misam-II permits automatic loading of Misam keys from an existing data file; another allows testing of a specific index during program development.

Development plans call for a future upgrade of Misam to optimize the features of DEC's Basic-Plus 2 and Version 6B of RSTS/E, Info-Boutique added.

Two Forms

Misam-II — described by the vendor as a "simple and inexpensive alternative or addition to complex and sophisticated data base systems" — is available in compiled form for \$3,000 or in Basic-Plus source code for \$6,000.

Info-Boutique Ltd. is at Suite 204, 3470 Simpson St., Montreal, Quebec H3G 2J5, Canada. The package is also available from Filetab Support Services in London, England, and from General Systems Ltd. in Middle Cove, New South Wales, Australia.

Pascal Implemented On CA's LSI-2 Mini

IRVINE, Calif. — Pascal has been added to Computer Automation, Inc.'s (CA) support for its LSI-2 series minicomputers.

A high-level, block-structured language, Pascal has control structures written in English which make it easy to learn and use, according to the vendor.

Bits and Pieces

Pascal incorporates its own set of diagnostics "with the data structure capabilities of Cobol, the compact arithmetic expressions of PL/I and the block-structured organization of Algol," CA said.

The modular block-oriented program organization and data structuring capabilities of Pascal simplify program design, debugging and updating, a spokesman added. New programs can be created simply by linking existing program modules together, he explained.

The explicit diagnostics of the Pascal language assist in debugging at compile and runtime. When an error is detected, Pascal indicates the error, the cause of the error and where it occurred, he said.

32K Memory Needed

CA's Pascal operates with a disk operating system, an I/O device and an LSI-2 series CPU with 32K words of memory and a real-time clock.

The Pascal software and documentation package is available now for a one-time charge of \$900, the company said from 18651 Von Karman, Irvine, Calif. 92713.

Data General RDOS Users Aided by Utility Package

DALLAS — The Squire utility package from S&F Systems operates on Data General minicomputers under RDOS. The routines will function as stand-alone runs or embedded in application programs, the vendor said.

The package includes sort, select, match, mergeformat, BCD-Ascii code conversion and report utilities and is available on perpetual or monthly lease plans.

Squire costs \$150/mo with individual modules starting at \$25/mo, the company said from 10057 San Lorenzo, Dallas, Texas 75228.

Burroughs users! Now you can eliminate your Achilles heel.

Would a large international bank and thousands of other commercial operations throughout the world use Burroughs computers unless they were very good? Obviously not.

But would the same large international bank, a large bank service company and many other commercial operations substitute IBM-1403's for their Burroughs printers, unless they felt they could improve their printing reliability?

Are quality and reliability of printing your Achilles heel?

If so, we have a simple solution. Adapt an IBM-1403 model -2, -3 or -N1 to your Burroughs system with our Grumman printer controller. The proven quality, speed and reliability of the IBM-1403's should dramatically improve the performance of your printing operations.

Your cost will be nominal. One Burroughs user says he can pay for our printer controller with the savings on ribbons alone. In any case, if you've been paying for extra printing capacity to solve reliability problems, you'll be more than happy with the IBM-1403.

Of course, printing quality and total output are not just Burroughs problems. We are delivering our printer controller to users of CDC, DEC, Univac, Xerox and other computers to solve similar problems. Commercial, educational, scientific, military and computer service bureaus are among our printer controller users.

For multi-vendor installations we can add a switch to your controller to allow you to connect the IBM-1403 to either of two different computers.

You can rent, lease or buy both the printer and controller. For full information, call or write Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, New York 11797. (516) 575-3034. Telex: 96-1430. TWX: 510 221-1842.



Grumman Data Systems

Products and services that lower the cost of computing.

Canada: Digital Interfaces Ltd., 4800 Dundas St. West, Islington, Ontario M9A 1B1

Finland: OY D. H. Wirkkala AB, YLAPORTTI 1A, 02210 ESP 00 21, Finland

Germany: Institut Für Angewandte Elektronik, Zentrale Verwaltung, D 2072 Bargteheide, Am Bargfeld 17, Germany

Switzerland: Intersystems AG, 4018 Basel/Switzerland, Dornacherstrasse 210

'Argos' Improves CICS Development, Debugging

NEW YORK — An update of the Argos package from Automata Research, Inc. allows users of IBM's Customer Information Control System (CICS) to have an on-line, full-memory browse of all critical CICS areas and the contents of the Cobol Base Locator Linkage (BLL) Cells, according to a spokesman.

The browsing can be done during actual step-by-step execution of the user's program under CICS, and the review of the BLL Cells can help in resolving problems

dealing with GETMAIN, he explained.

Release II of Argos also allows the user to alter memory in the transaction work area and other noncritical CICS program memory. String searches on any keyword enable the programmer to find any section in the source program on-line, he added.

A remote debugging facility enables the user to "enslave" a terminal and, if an Abend occurs, to display the Abending program identification and the names of the last seven Cobol paragraphs executed.

With such real-time diagnostic support, most Argos users have dispensed with CICS dumps, he claimed.

In addition to supporting debug operations, Argos II is said to speed up the program development cycle. The user can run a compilation and monitor its execution on the Argos active job queue display.

When he sees the job is done, the programmer can display the listing on his CICS terminal screen, getting map, diagnostics and Linkedit statements, the vendor noted.

If there is a problem, the user can fix it immediately without waiting hours for a batch compile listing, it claimed.

Argos II is available to CICS Cobol users in both OS and VS versions for \$8,000 under a permanent lease arrangement. Automata Research is at Suite 3308, 350 Fifth Ave., New York, N.Y. 10001.

Isam Reorganization Faster With 'Dcrabs'

JACKSONVILLE, Fla. — Version 2.7.0 of the Disk Copy Restore and Backup System (Dcrabs) from Generic Systems, Inc. (GSI) is said to include an Indexed Sequential (Isam) reorganization facility faster than any method previously possible.

Originally designed to reduce DOS and DOS/VS disk-file backup and library condense times, the package has capabilities allowing saving, copying and restoring between different disk types, file types, library types and disk locations, GSI said.

With the update, users can have Isam files restored, copied and reorganized "two to 10 times faster" than before, a spokesman claimed.

Other enhancements support more direct user interaction with Dcrabs capabilities. Support for user exits, for example, permit user programs to interface with Dcrabs to examine, create or alter logical records during Dcrabs operations, the spokesman said.

The same facility, used in stand-alone mode, allows the reading of saved tapes created by Dcrabs, he added.

Another feature now allows users to specify tape block sizes. This might be useful, GSI explained, if smaller blocking is needed to allow use of smaller partitions or if larger blocks are desired to improve performance.

The package has also been extended to permit the introduction of data from other tapes when files are being restored.

The updated Dcrabs is now available for a one-time cost of \$2,000, GSI added from 4251 University Blvd. S., Jacksonville, Fla. 32216.

Year-End Security Values Listed on Magnetic Tape

NEW YORK — Year-end price evaluations for a large number of corporate and municipal securities, computed for use in calculating capital gains for federal estate and gift taxes according to the 1976 Tax Reform Act, are now available from Interactive Data Services, Inc.

The Interactive service provides Dec. 31, 1976 evaluations for more than 31,000 corporate and government securities and for more than 1.7 million municipal securities, the vendor claimed.

The evaluations are available in a variety of formats including book, magnetic tape, microfiche, microfilm and customized listings.

Values on the listings have been determined according to methods arrived at through close interpretation of the new tax regulations, a spokesman noted. Municipal evaluations represent the average market value of each issue, he added.

The book, microfiche and microfilm forms of the evaluations cost \$50 each. The magnetic tape format costs \$250 and the customized lists sell for 30 cents per security subject to a \$30 minimum charge, the company said from 22 Cortlandt St., New York, N.Y. 10007.

erisa?

If the personal penalties for management violation of the Employee Retirement Income Security Act of 1974 have you worried, then take heart.

Wang has 360/370, Burroughs, Honeywell and Univac, ERISA software, designed, installed and running, coast to coast, safeguarding the pensions of more than one million workers and protecting the careers of their managers.

For more on ERISA, call Joe Nestor (617) 851-4111, Wang Laboratories, Lowell, MA 01851. In California, call Carl Tarascio (714) 631-0138.

WANG

Once you compare
THE SPOOLER
you can't afford
not to call us.

THE BENCHMARK RESULTS ARE IN! We now have comparisons of **THE SPOOLER** with competing enhancement systems for DOS and DOS/VS.

THE SPOOLER vs. POWER/VS:

- 35% increased THRUPUT
- 33% fewer CPU cycles
- 82% less Virtual Memory
- 61% smaller Working Set
- And it ran COMPLETELY VIRTUAL.

The following are results from a comparison of 40 features found in enhancement systems:

System	No. of Features	% of total
ASTEC	13	33%
GRASPVs	22	55%
POWER/VS	15	38%
THE SPOOLER	37	93%

Compare. Call us for details on how **THE SPOOLER** can mean 10% to 100% INCREASED THRUPUT for you.

You can't afford not to.

(703) 433-9141

DataCorp

of Virginia, Inc.
RNB Center,
Harrisonburg, VA 22801

CONSIDERING

TSO?
CMS?
CRJE?
ATMS?
VSPC?
ROSCOE?
WYLBUR?
SPM/OL?

TRY

MENTEXT!

- ☐ Please send more information on MENTEXT.
☐ Please contact me about your 15 day trial.

Name

Title

Company

Address

City

State

Zip

Telephone

Ext.

Send to: MENTEL, INC.,
459 Hamilton Avenue
Palo Alto, California 94302
415 321-2787

A 'Sterling' Performance

DBMS Provides Base for On-Line Order Entry System

HOUSTON — It was the reality of the marketplace that prompted a service bureau, whose parent company is a leading supplier of electronic components, to create a complex on-line inventory/order entry system.

It was a data base management system (DBMS) that made it work.

The service bureau is Sterling Computer Systems, Inc. (SCS), and the parent company is Sterling Electronics Corp.

The applications program was created to give Sterling Electronics a competitive edge in a volatile business. The company is, in essence, several businesses including distribution of electronics

components (through 13 branches); retailing; manufacturing of OEM electronic components, and the service bureau.

"We became involved with the creation of an on-line inventory control system principally because of the nature of our parent company's industrial distribution business," Michael H. Partin, president of SCS, explained.

"The industrial components business is highly competitive, requiring fast shipment of comparatively small quantities of items."

"The name of the game is having sufficient product in stock to effectively service customers while maximizing inventory turns and reducing product obsolescence," he continued.

"The electronics business is highly volatile from the standpoint of technology. Devices and products that are 'hot' today and selling in large quantities are replaced by superior new devices created tomorrow."

After SCS made the decision to create its own on-line system, a first step was selection of DBMS and data communications systems software.

Partin explained why the bureau selected the Datacom data base (DB) management and data communications (DC) packages from Computer Management Information Co. (CIM).

"First we wanted the on-line system to be operational within a relatively short period of time. We were talking about roughly a year's time span from the standpoint of actual system programming to being operational," he said.

"We needed the ability to access multiple files with a variety of keys. For example, in the distribution business you might have a component that's Brand X. You have a request for it and it is out of stock, and you have to be able to cross reference to another manufacturer's product line to substitute Brand Y."

"You need a wide variety of keys to be able to locate inventory, sales or purchase orders and determine status rapidly. The files need to be accessed randomly," he continued.

"We needed the ability to compress data within a file to reduce the amount of disk storage required to handle the massive volumes of data required in our business."

Partin explained SCS also wanted to avoid the expense, time and difficulties associated with interfacing two separate systems.

The Datacom DB/DC software is unique in that it was created as an integrated system, he noted.

"The decision to go with Datacom was a good one," Partin said. "Not only did it allow us to meet our schedule in creating the applications programs, but CIM was quite helpful in the design of the inventory control system data access keys."

The applications presently run by SCS's on-line system include sales order entry, purchase order entry, printing of packing slips and an on-line receiving function.

As soon as merchandise is received and checked, the operator enters the receipt through the terminal and the computer instan-

taneously updates the inventory status files. Credit and debit memos are also entered.

A myriad of inquiries are available for accessing sales order/purchase order/inventory and parts master information files.

The system has the ability to update all files and to perform all file maintenance operations on-line. At present SCS has 206 on-line programs. In batch mode, programs handle file audits, sales reporting and sales analysis.

Invoicing is a by-product of on-line activity once shipping confirmation has been entered into the system. The system also provides for sales accounting including automatic costing using the Last In-First Out basis.

Batch, Real-Time Uses

Purchase orders are printed in batch mode. They also produce a suggested buy/overstock report for the purchasing department's use in stock replenishment or stock reduction activities.

There are approximately 80 batch programs executed on a daily, weekly or monthly basis.

The present operating environment consists of a 512K IBM 360/50 and three selector channels, Partin said.

The programs run under a 26K DOS supervisor (release 26.2), a 30K Asap spooler from Universal Software, Inc.; and 84K multi-user-multidata base facility (DB6.0) with three partitions, 194K, 122K, and 54K.

Real-time applications (on-line) are managed by CIM's Datacom Release 4.2 in the largest partition.

The communications network,

which uses 3270-type terminals, presently includes: a local line for the Houston branch serving 12 terminals and two line printers; a 4,800 bit/sec multipoint dedicated line to the Dallas branch serving 12 terminals and one line printer; and a line drop from Dallas to the Austin branch serving two terminals.

This configuration has proved extremely flexible, Partin said. During on-line operations, SCS can run any type of application programs in the other two partitions, and at night it runs batch in all partitions concurrently.

STANDARDS

Is your organization installing or upgrading Performance/Documentation Standards?? For a free 25 page list of required standards write to:

Management Dimensions
1552 Chestnut Street
San Francisco, Calif. 94123

CASH

for 3277's
COMDISCO
9701 W. HIGGINS RD.
ROSEMONT, ILL. 60018
(312) 698-3000

NEEDED IMMEDIATELY

Top Prices Paid for Rented or Owned

IBM 3277-2 CRT's

With large screen

Will also buy for future delivery

CALL COLLECT OR WRITE

BERLENT INDUSTRIES INC.

1975 Hempstead Turnpike
East Meadow, N.Y. 11554 (516) 794-9722



Computer Dealers Association

370/138's 370/148's

*2yr and 3yr

Leases Available

*Leases TAILORED to meet
Your D.P. Requirements

National Computer Rental, Ltd.

415 Madison Avenue
New York, New York 10017

Tel. No. (212)532-1500

Member of Tiger Leasing Group
Member Computer Lessors Assoc.

Improve your MVS visibility.

SARA IV, the new BCS management information system for MVS installations provides:

- Specialized SRM performance reports
- Detailed displays of MF/1 data
- System Performance Statistics
- Complete job, step and program analysis
- Flexibility to generate custom reports
- An Exception Reporting Feature
- Management Data for Resource Planning and Control
- Comprehensive Projection and Planning Reports
- Graphic Data Display

SARA versions are available to support other IBM and Honeywell systems.

To schedule a product demonstration, please call (800) 336-0135, or mail the coupon.

BOEING COMPUTER SERVICES, INC.

7777 Leesburg Pike, Suite 217
Falls Church, VA 22043

I want more information on SARA.

Name _____ Title _____

Company _____ Phone _____

Address _____

City/State/Zip _____

BCS

BOEING COMPUTER SERVICES, INC.

IBM SYSTEMS

370 or 360

and

PERIPHERALS

Buying?

We have new and pre-owned systems available

Selling?

We buy pre-owned systems, in whole or in part.

Upgrading?

We can provide you with a new system and buy or sub-lease your current one.

We offer creative financing alternatives with every system we market. Alternatives that conform to your budget.

The way to satisfy your full range of needs is through a full service dealer.



CIS Corp.
600 Mony Plaza
Syracuse, N.Y. 13202

315-425-1900

TELEX: 93-7435

For Distributed Processing Users

HDLC Support Leads List of Honeywell Introductions

By John P. Hebert
And Esther Surden
Of the CW Staff

NEW YORK — Along with the expansion of its Series 60 computer systems [CW, Jan. 31], Honeywell Information Systems, Inc. (HIS) announced a passel of communications products designed for distributed processing, as well as its support of High-Level Data Link Control (HDLC).

The bit-oriented HDLC protocol uses only seven out of eight proprietary bit checks, resulting in greater information transfer at all transmission speeds, according to an HIS spokeswoman.

In addition, HDLC now has the ability to accommodate full-duplex operation, she said, adding

the protocol is a major element of HIS' distributed systems environment.

In conjunction with its support of HDLC, HIS said it will offer satellite processors based on the firm's Level 6 minicomputers at a later date.

Network Processor

Heading the communications product introductions was the Datanet 6678 front-end processor, which is based on a Level 6 minicomputer.

The 6678 has an instruction execution time of 1M instruction/sec, two times faster than the Datanet 6632, the spokeswoman said.

In addition, memory capacity has been doubled for a 256K word

maximum and the physical cabinet size is about four times smaller than the largest Datanet 6632 front-end processor, she said.

The DST6/500, the first in a family of compatible intelligent terminals for distributed processing, was also announced. It is based on either a 6/34 or 6/36 minicomputer and was designed to permit entry and editing of data for further processing by a remote system, HIS said.

File transmission to and from host systems can take place in synchronous mode at speeds up to 4,800 bit/sec. Operation of up to four CRT stations with independent functions is a feature of the diskette-based DST6/500, the firm noted.

The basic distributed system terminal includes a 6/34 or 6/36 mini with 16K words of MOS main memory, one operator display station and a single diskette with 256K bytes of storage.

Various configurations provide up to 64K words of main memory, up to four display stations, up to two 300- and/or 600 line/min or serial 165 char./sec printers and four diskettes or optional disk cartridge storage of 5M- or 10M bytes.

Remote Batch Terminals

The RBT 6/300 remote batch terminals, also based on a Level 6 mini, support one to four synchronous jobstreams to the same CPU or multiple host processors.

The RBT 6/301 is the basic terminal. It supports one communications line and requires a Level 6 with 8K of memory, a 300- or 500 card/min reader, one of four 240- to 600 line/min printers, a CRT or teletypewriter console, HIS said.

The RBT 6/302 configuration includes a Level 6 CPU with 16K- to 64K words of memory, a diskette, one to four card readers or printers, a console and up to four communications lines.

Both 6/300 series terminals use a Remote Computer Interface protocol and transmit data synchronously at speeds up to 9,600 bit/sec on each line, the company said.

HIS also brought out two CRT terminals primarily designed for interactive on-line access to a large data base, the VIP 7700R and VIP 7705R.

The 7700R can display 63 sym-

bols and upper case alphabets while the VIP 7705R can display 95 upper/lower-case characters, HIS said.

All data displayed on the terminals' 1,920-character screens is transmitted as a page; only variable information fields filled in by the operator are transmitted when the system is operating in a forms mode with "fill-in-the-blanks" capability, the spokeswoman noted.

The 7700R series units are said to feature error protection when multiple keys are depressed, automatic tab, message flashing and data entry repeat.

Keyboards can be placed up to three feet from the screen and the terminal can operate as either a single station or in clusters of two to 10 stations, the firm added.

The Datanet 6678 front-end network processor with 64K words of memory, system support controller, a direct interface adapter and six channel interfaces costs \$190,870 or \$4,010/mo on a five-year rental.

Prices for the DST6/500 intelligent terminal system range from about \$12,000 for the basic system to approximately \$30,000.

The RBT 6/301 costs about \$21,000 for a basic system and the 6/302 is priced at about \$28,000 for a configuration including a CRT console, 16K of memory, a 300 card/min card reader, 165 char./sec printer and one host communications link.

RBT 6/300 series deliveries will begin in the second quarter.

The VIP 7700R and 7705R CRTs both cost about \$4,000.

HIS is located at 200 Smith St., Waltham, Mass. 02154.

American Express EFT System Allows Cardholders to Get Checks at Any Time

By Catherine Arnst
Of the CW Staff

NEW YORK — Believing that the most aggravating problem to a traveler is running out of money, American Express (AE) established an electronic funds transfer (EFT) system in September that allows its cardholders to obtain travelers checks 24 hours a day.

AE installed 23 Docutel Corp. automated teller machines (ATM) at 17 U.S. airports which allow cardholders to obtain up to \$500/week in travelers checks by inserting their cards and typing a four-digit personal identification number (PIN) and the amount desired on the ATM keyboard.

The dispensed travelers checks are electronically debited directly from the cardholder's bank account rather than from his card account.

The ATMs were specially designed by Docutel for the AE application, according to Nancy Mackta, program manager for AE's Travelers Cheque Division.

An EFT method of charging customers was selected because of state and federal regulations that prevented the company from charging its customers' card accounts since that would, in effect, constitute a loan.

When a cardholder uses the ATM, a connection is made over

leased Western Union, Inc. lines to AE's communications center in Phoenix. The data is transmitted at 300 bit/sec to a Honeywell Information Systems, Inc. 716 CPU.

There, the card number and PIN are checked to ensure the user is eligible for the service and has not gone over the allowed \$500/week limit.

If the transaction is approved, travelers checks are issued in \$100 packets, Mackta said, adding the transaction takes about two seconds after the connection is made.

If the transaction is not approved, a phone on the ATM rings and the user is connected to someone in Phoenix who explains the problem.

"The mechanical credit authorization only displays a 'yes' or 'maybe.' Only a human can say 'no' to the customer, Mackta said.

The necessity of voice communications created some unique problems in the system design, she said. Docutel had to specifically design a machine with a telephone capability and the design had to be modified considerably to meet Federal Communications Commission regulations.

Controlled by software within the Docutel machine, the phone is activated only when a card is in-

serted and connects only to the Phoenix center. By pushing a button on the ATM, a user can also call Phoenix after his card is inserted.

The phone lines, according to Mackta, are supplied by AT&T.

Once the data is locked in the data file in Phoenix, it is sent simultaneously to the Travelers Cheque Division and to the Chase Manhattan Bank in New York.

Chase Manhattan debits the account from the cardholder's bank and he receives a sight draft similar to a cancelled check in his next bank statement.

(Continued on Page 24)

Unit Turns Terminal Into Stand-Alone

CAMPBELL, Calif. — The Micro File floppy disk system from Data Communications and Terminals (DTC) reportedly transforms an RS-232 CRT or printer terminal into a stand-alone system or intelligent terminal.

Based on the Intel 8080A microprocessor, Micro File incorporates 7K read-only memory (ROM) and 8K random-access memory (RAM) on one or two dual floppy disks with an average access time of 200 msec, according to the firm.

The standard language includes a text editor and utility routines; an Extended Basic interpreter package is optional. Micro File is said to be specifically aimed at locations where time-sharing is restricted or expensive.

The disk system operates at switch-selectable data rates from 110- to 9,600 bit/sec in asynchronous Ascii, although other speeds and codes are available by special request, DTC said.

Data is formatted on 77 tracks in 32 sectors with 128 characters each and is divided into three areas: a space allocation map, a file directory and user-generated data files, the company added.

In addition to up to 1.2M characters of storage, options include a development console and expandable RAM memory in 16K increments to a maximum of 56K characters, DTC said.

The cost of Micro File starts at \$4,295, DTC said from 1190 Dell Ave., Campbell, Calif. 95008.

Talk to us about Data Communications



That's right, Anderson Jacobson. We started with the industry's first accepted acoustic coupler and we've been expanding ever since. If you want the very best data communications equipment—couplers, modems, modem systems, cassette recorders, and an unmatched selection of keyboard printer terminals... then talk to us.

A phone call or letter to our marketing department will get you "on-line" with the best peripheral equipment for your computer system.



**ANDERSON
JACOBSON**

521 Charcot Avenue • San Jose, CA 95131 • (408) 263-8520
Paris, France • London, England • Ottawa, Ontario

AUXCO ANNOUNCES RECORD EARNINGS AND DIVIDEND

Auxton Computer Enterprises, Inc., (AUXCO) announces a doubling of its dividend from \$.05 per share paid in 1976 to \$.10 per share to be paid on February 24 to shareholders of record at the close of business on February 10. Auxco also announces record earnings of \$241,851 on revenues of \$4,751,103. Net income per share was \$.28 in 1976 versus \$.10 in 1975.

AUXCO's stock is quoted in the NASDAQ System under the symbol AUXT and listed daily in The Wall Street Journal under, **Additional OTC Quotes.**

ICC Extends Options for System 180

MIAMI — The System 180 Network Diagnostic Controller from International Communications Corp. (ICC) has been upgraded to include optional memory, a printer and an alphanumeric keyboard.

An optional IBM-compatible diskette expands the data base information storage by 256K bytes, increasing the System 180's network diagnostic scanning capability, an ICC spokesman said.

The additional storage can be used to create and maintain data base information describing the characteristics of the communica-

tions lines as well as remote modems and power or terminal controllers, he explained.

An optional hard-copy printer can be added to the diagnostic system for recordkeeping purposes; the addition of letter characters to the previous numeric keyboard allows increased opera-

tor interaction with the CRT display, he said.

A "typical system configuration" with the floppy disk and printer, including the basic diagnostic package, ranges from \$25,000 to \$30,000, he said from 8600 N.W. 41st St., Miami, Fla. 33166.

Micon Has Small, High-Speed CRT

OAKLAND, Calif. — Micon Industries' KDM series terminals aimed at hobbyists are small interactive keyboard/display devices capable of 9,600 bit/sec

transmission speeds.

All the KDM series terminals have full ASCII keyboards, power supply and RS-232 interface and operate at speeds from 110- to 9,600 bit/sec.

The KDM/1 has a 32-char. alphanumeric display, while the KDM/2 can drive a TV monitor for display of 16 lines of 64 characters. The Model 3 has a 24-line by 80-character display, Micon added.

Options for the terminals include an acoustic coupler, 40K-char. mini-cassette tape storage unit, badge reader and current loop interface, a spokesman noted.

Prices for the KDM/1, -2 and -3 are \$400, \$500 and \$700 respectively, Micon said from 252 Oak St., Oakland, Calif. 94607.

AE Debits Checks By EFT System

(Continued from Page 23)

When a cardholder applies for the service, he authorizes the debiting of his bank account. AE has no knowledge of the user's bank balance at the time of the transaction; if there is not enough to cover the amount obtained in checks, AE treats the problem as it would a bad check.

It does not expect much loss because of this, however, Mackta said.

Approximately 300,000 cardholders have chosen to use the system so far and there has been "surprisingly little negative reaction to direct debit" and very little fraud loss, Mackta said.

Operationally Successful

The system is considered successful by AE from an operational standpoint, she added. The total uptime for the system was 97.8% in the first two months of operation.

The system is not financially profitable, but AE claims it is not evaluating the service from the standpoint of profitability. The company is planning to install 35 Docutel machines at 25 airports in the next few months and "35 machines will never be profitable," Mackta said.

"The principle reason for starting the service was to provide more card benefits for our customers," she noted.

In 1964, MDS introduced
the first step into
modern data entry.

Now,
MDS
introduces
Series 21

...the first easy step into
distributed processing.

Series 21 is a brand new family of distributed processing systems unlike any yet announced — highly versatile and truly inexpensive. This means you can easily cost-justify your initial move into distributed systems. Now you can equip a small office or your entire organization at a lower cost than with less capable systems now on the market.

Series 21 is a simple extension to your current operations. It lets you disperse existing data entry applications or add new ones quickly. It is a powerful upgrade path for intelligent terminals that need more capacity but are limited to a single station. It is a quick, high-performance replacement for your key-to-tape or keypunch devices. And it is an ideal starting point for new applications.

Series 21 possesses advanced big system specifications. Multi-station configurations. BSC and SDLC communications. High-level English-like programming language. Expandable disk storage. Multiple peripherals. Powerful data entry, editing and processing features.

Series 21 is easy to start using. Begin with simple data entry tasks—the

ones you are already performing. Our Formatted Data Entry Package gets you started in just hours. Then grow to advanced applications—such as custom validation, communications and transaction processing—by simply upgrading your system in place.

Series 21 represents a long-term growth path. It begins with two models, one for data entry and one for application processing. They are called System 21/20 and System 21/40 respectively and with what we've got planned, Series 21 is all you'll ever need for your distributed information systems.

Best of all, with Series 21 you get MDS' worldwide support organization, the largest among data entry suppliers—with over 2,500 skilled people in 300 offices around the world.

Series 21—when you want to go to distributed processing. MDS—when you want to be sure of getting there.

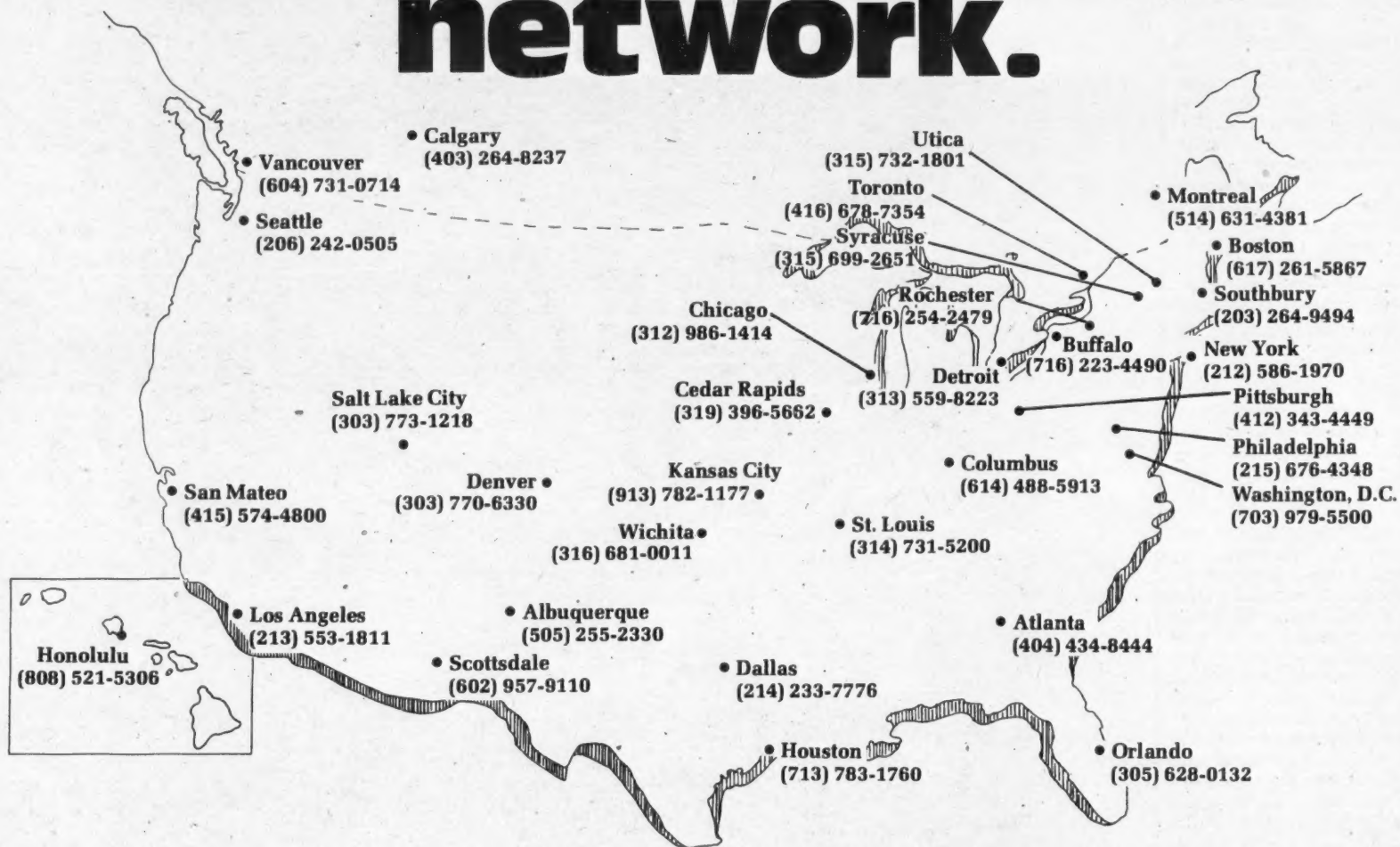
Call or write Mohawk Data Sciences Corp., Executive Headquarters, 1599 Littleton Road, Parsippany, New Jersey 07054—Telephone 201/540-9080.



Mohawk MS
Data Sciences
The Intelligent Choice.

CASH
3330 disk
drives
COMDISCO
9701 W. HIGGINS RD.
ROSEMONT, ILL. 60018
(312) 698-3000

Hazeltine is turning North America into one gigantic computer terminal sales and service network.



**modular
one**

Clearly the new Standard in Its Class



Sales Representatives are standing by to answer your call for a demonstration in your office.

Hazeltine Corporation, Computer Terminal Equipment, Greenlawn, New York 11740 (516) 549-8800 Telex 96-1435
For Worldwide Sales Information Call: (516) 549-8800

AUXCO ANNOUNCES RECORD EARNINGS AND DIVIDEND

Auxton Computer Enterprises, Inc., (AUXCO) announces a doubling of its dividend from \$.05 per share paid in 1976 to \$.10 per share to be paid on February 24 to shareholders of record at the close of business on February 10. Auxco also announces record earnings of \$241,851 on revenues of \$4,751,103. Net income per share was \$.28 in 1976 versus \$.10 in 1975.

AUXCO's stock is quoted in the NASDAQ System under the symbol AUXT and listed daily in The Wall Street Journal under, **Additional OTC Quotes.**

ICC Extends Options for System 180

MIAMI — The System 180 Network Diagnostic Controller from International Communications Corp. (ICC) has been upgraded to include optional memory, a printer and an alphanumeric keyboard.

An optional IBM-compatible diskette expands the data base information storage by 256K bytes, increasing the System 180's network diagnostic scanning capability, an ICC spokesman said.

The additional storage can be used to create and maintain data base information describing the characteristics of the communica-

tions lines as well as remote modems and power or terminal controllers, he explained.

An optional hard-copy printer can be added to the diagnostic system for recordkeeping purposes; the addition of letter characters to the previous numeric keyboard allows increased opera-

tor interaction with the CRT display, he said.

A "typical system configuration" with the floppy disk and printer, including the basic diagnostic package, ranges from \$25,000 to \$30,000, he said from 8600 N.W. 41st St., Miami, Fla. 33166.

Micon Has Small, High-Speed CRT

OAKLAND, Calif. — Micon Industries' KDM series terminals aimed at hobbyists are small interactive keyboard/display devices capable of 9,600 bit/sec

transmission speeds.

All the KDM series terminals have full ASCII keyboards, power supply and RS-232 interface and operate at speeds from 110- to 9,600 bit/sec.

The KDM/1 has a 32-char. alphanumeric display, while the KDM/2 can drive a TV monitor for display of 16 lines of 64 characters. The Model 3 has a 24-line by 80-character display, Micon added.

Options for the terminals include an acoustic coupler, 40K-char. mini-cassette tape storage unit, badge reader and current loop interface, a spokesman noted.

Prices for the KDM/1, -2 and -3 are \$400, \$500 and \$700 respectively, Micon said from 252 Oak St., Oakland, Calif. 94607.

AE Debits Checks By EFT System

(Continued from Page 23)

When a cardholder applies for the service, he authorizes the debiting of his bank account. AE has no knowledge of the user's bank balance at the time of the transaction; if there is not enough to cover the amount obtained in checks, AE treats the problem as it would a bad check.

It does not expect much loss because of this, however, Mackta said.

Approximately 300,000 cardholders have chosen to use the system so far and there has been "surprisingly little negative reaction to direct debit" and very little fraud loss, Mackta said.

Operationally Successful

The system is considered successful by AE from an operational standpoint, she added. The total uptime for the system was 97.8% in the first two months of operation.

The system is not financially profitable, but AE claims it is not evaluating the service from the standpoint of profitability. The company is planning to install 35 Docutel machines at 25 airports in the next few months and "35 machines will never be profitable," Mackta said.

"The principle reason for starting the service was to provide more card benefits for our customers," she noted.

In 1964, MDS introduced
the first step into
modern data entry.

Now, MDS introduces Series 21

...the first easy step into
distributed processing.

Series 21 is a brand new family of distributed processing systems unlike any yet announced — highly versatile and truly inexpensive. This means you can easily cost-justify your initial move into distributed systems. Now you can equip a small office or your entire organization at a lower cost than with less capable systems now on the market.

Series 21 is a simple extension to your current operations. It lets you disperse existing data entry applications or add new ones quickly. It is a powerful upgrade path for intelligent terminals that need more capacity but are limited to a single station. It is a quick, high-performance replacement for your key-to-tape or keypunch devices. And it is an ideal starting point for new applications.

Series 21 possesses advanced big system specifications. Multi-station configurations. BSC and SDLC communications. High-level English-like programming language. Expandable disk storage. Multiple peripherals. Powerful data entry, editing and processing features.

Series 21 is easy to start using. Begin with simple data entry tasks—the

ones you are already performing. Our Formatted Data Entry Package gets you started in just hours. Then grow to advanced applications—such as custom validation, communications and transaction processing—by simply upgrading your system in place.

Series 21 represents a long-term growth path. It begins with two models, one for data entry and one for application processing. They are called System 21/20 and System 21/40 respectively and with what we've got planned, Series 21 is all you'll ever need for your distributed information systems.

Best of all, with Series 21 you get MDS' worldwide support organization, the largest among data entry suppliers—with over 2,500 skilled people in 300 offices around the world.

Series 21—when you want to go to distributed processing. MDS—when you want to be sure of getting there.

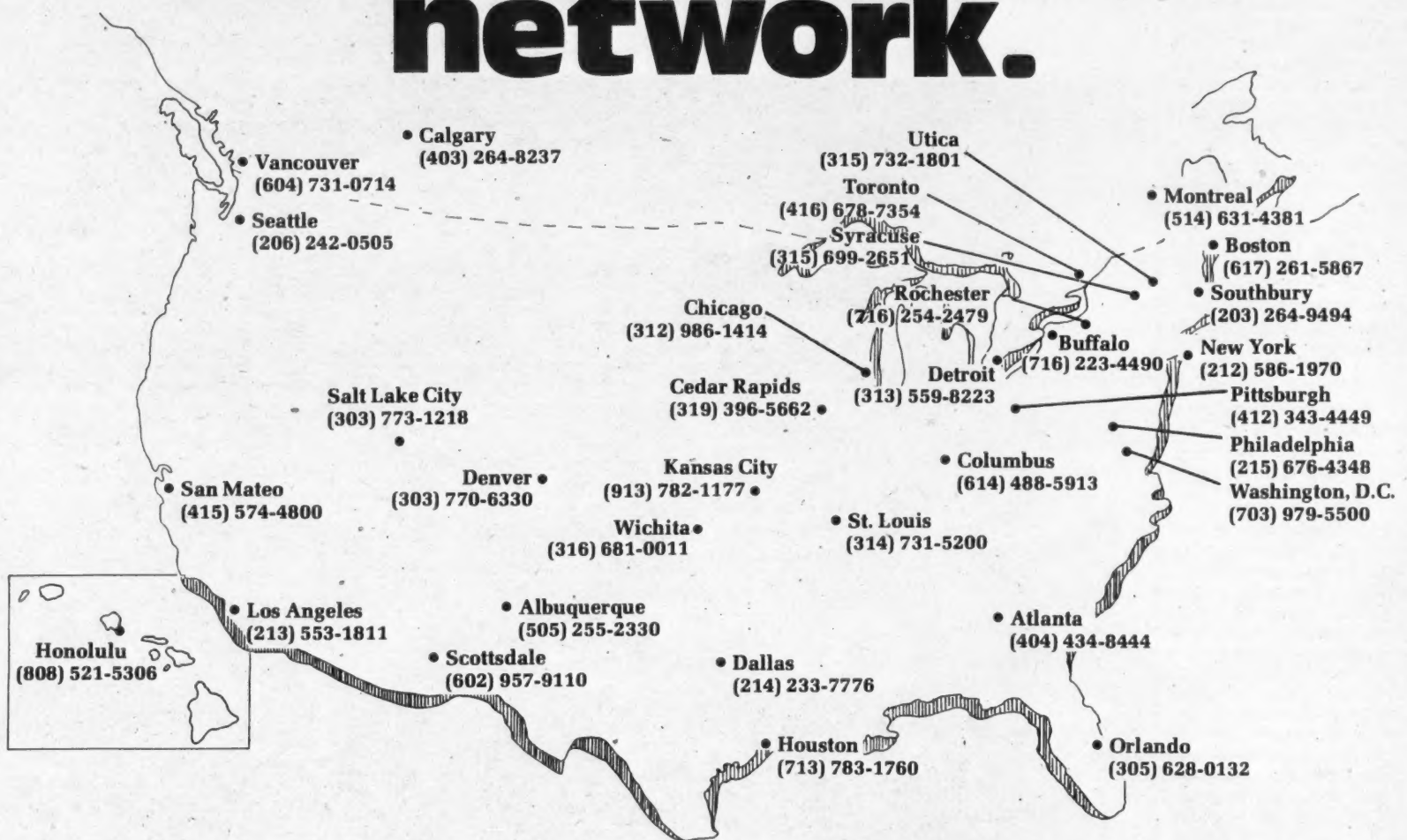
Call or write Mohawk Data Sciences Corp., Executive Headquarters, 1599 Littleton Road, Parsippany, New Jersey 07054—Telephone 201/540-9080.



Mohawk MDS
Data Sciences
The Intelligent Choice.

CASH
3330 disk
drives
COMDISCO
9701 W. HIGGINS RD.
ROSEMONT, ILL. 60018
(312) 698-3000

Hazeltine is turning North America into one gigantic computer terminal sales and service network.



**modular
one**

Clearly the new Standard in its Class



Sales Representatives are standing by to answer your call for a demonstration in your office.

Hazeltine Corporation, Computer Terminal Equipment, Greenlawn, New York 11740 (516) 549-8800 Telex 96-1435
For Worldwide Sales Information Call: (516) 549-8800

New York Times Editors Trade Blue Pencils for CRTs

NEW YORK — The *New York Times* is making progress in the massive job of conversion from typewriters and blue pencils to CRT terminals for writing and editing news copy.

Three computer systems and a total of 48 terminals from Harris Corp. in Melbourne, Fla., have been installed since last summer. Currently, the terminals are being used by copy editors for daily editions and by some Sunday feature editors. Eventually, the *Times* may install additional equipment, including a total of up to 325 terminals for use by reporters as well as editors.

Installation of the three Harris 2550 copy processing systems, each with dual 66M-byte disk drives attached for news copy storage, is part of a switch from hot metal to cold type production scheduled to take place over the next several years.

The Harris equipment presently serves as a front end to a *Times*-developed system which punches paper tape to drive hot metal typesetting machines. Eventually, Harris controllers will drive phototypesetters directly.

"We wanted a system which would allow us to capture keystrokes further upstream to minimize the need for rekeying in the composing room," said John Werner, director of research, development and technical support at the *Times*. "For the short term, our objective was to capture that copy which already existed in digitized form — wire copy."

Two of the *Times*' Harris 2550 systems meet that objective by handling 10 incoming news bureau and wire service lines, including three lines for copy transmitted from portable terminals used by reporters. The third system is used for backup.

Hardware components of each system include a central processor with 128K words of core memory, two 66M-byte moving head disks, 24 CRT terminals, three Extel 30 char./sec printers and a 450 line/min printer.

Each terminal is linked to one of the two primary systems; however, copy stored in one system can be transferred to the other via keyboard command, allowing any story stored in either system to be sent to any terminal.

Allan M. Siegal, assistant to the managing editor for news technology, said the systems process approximately 35 news columns daily, with columns averaging 1,000 words each.

Presses Must Run

A major goal of the conversion to electronic editing is to save time, according to Siegal. "Each night, our presses are scheduled to start at 9:14 p.m. If they don't, 50,000 copies of our early edition might well not make their

scheduled flights. If we blow that schedule, we've blown it for 24 hours."

A second goal is accuracy: what the editor releases is exactly what the reader sees, Siegal said. And a third is to relieve weekly feature sections of the burden of resetting copy after editorial corrections and layout changes.

Explaining, for example, the application of the systems on the *Times*' foreign desk, Siegal said, "stories written by our international bureaus are funneled through London and transmitted

to New York from there over two wire lines.

"Those stories are now stored on disk and a hard copy of each story

each editor has a terminal.

Siegal explained that copy editors on the national, financial, sports and metropolitan desks, as

handled by the foreign and national desks is being edited on terminals since it is transmitted via wire from London and Washington, respectively, and is already digitized.

A portion of the copy handled by the *New York Times*' metropolitan, financial and sports desks is also edited on terminals when it is phoned in by reporters to the *Times* telephone recording room, which is also equipped with CRTs. Some metropolitan copy enters the system via the

(Continued on Page 27)

Terminal Transactions

is printed simultaneously for use by our senior editors. They typically make only brief comments, rather than extensive changes, and so are not yet using terminals. The hard copy of each story is then routed to the copy desk, where

well as the foreign desk, can call stories from appropriate directories, make whatever editing changes are necessary and return stories to memory with keyboard commands from CRTs.

Siegal said most of the copy



**2 WK. of
delivery of
3277's
COMDISC**

9701 W. HIGGINS RD.
ROSEMONT, ILL. 60018
(312) 698-3000

ACS Adds Interactive Printer

SUNNYVALE, Calif. — The ACS-3780 from Applied Computer Systems (ACS) is an interactive printer with a 4K-byte random-access memory (RAM) buffer.

The unit is said to print at rates from 10- to 45 char./sec with the Diablo Hytype II metal or plastic printer fonts.

It is capable of communicating at speeds of 600-, 1,200-, 2,400- and 4,800 bit/sec, according to an ACS spokesman.

Keyboard configurations for the printer include APL, Ascii and IBM 2741-compatible. The 4K RAM buffer can be expanded to 64K bytes, the spokesman noted, adding the terminal comes with an RS-232 or current loop interface.

The unit can provide off-line program editing and stand-alone word processing using an optional CRT module, dual floppy disks and a software editor, ACS said.

The basic wide-carriage ACS-3780 costs \$4,500, ACS said from 248 Sobrante Way, Sunnyvale, Calif. 94086.

Bank Unit, Device With Touch Screen Extend Megadata Intelligent 700 Series

BOHEMIA, N.Y. — Megadata Corp. has added two terminals — one with a touch-screen interaction device and a programmable terminal designed for the banking industry — to its intelligent 700 series lineup.

The System 700/TS is an applications-oriented, X-Y addressable CRT/keyboard terminal with a touch resolution of 240 points or "pads" on the 1,920-character screen, according

to a Megadata spokesman.

Better resolution areas, down to one character, can be achieved with sharper objects such as a pen, he noted.

The 700/TS is RS-232-compatible and operates asynchronously at speeds from 75 bit/sec to 37.5 kbit/sec, although higher speeds can be attained with a buffer option, he added.

The touch-screen operation is performed via a Megadata process

called Display Surface Wave Reflection (DSWR).

Megadata's 700/CT is a specialized communications CRT terminal intended for bank operations, but is flexible enough for varied inquiry/response applications, according to the spokesman.

The 700/CT can be loaded from a host CPU with frequently used phrases that can be included in transactions by depressing one of up to 71 function keys, the company said.

The terminal has a 12-bit microprocessor and 73K-byte memory and can be programmed to operate with any computer using any communications protocol,

Terminal Transactions

format, line discipline or speed up to 18.4 kbit/sec, the spokesman claimed.

The 700/CT's keyboard layout, status indicators and audible alarms are reportedly tailored to fit each bank's requirements. Special editing and control features under program control offer enhancements which are said to reduce CPU overhead.

Depending on the interface, one 700/CT can handle all bank transaction distribution networks, eliminating the need for separate devices for each wire service.

The price for the 700/CT, which depends on the application, memory and programs desired, ranges from \$3,900 to about \$8,500, according to the spokesman.

Megadata's touch-screen terminal costs \$6,000 to \$12,000 depending on options desired. The basic terminal includes a program to operate with the touch-screen capability, an RS-232 interface and an editing package allowing operation as a standard CRT terminal.

Megadata Corp. (formerly Megadata Computer and Communications Corp.) is at 35 Orville Drive, Bohemia, N.Y. 11716.

Editors Trading Pencil for CRT

(Continued from Page 26)

Associated Press wire and some news is transmitted from the Washington bureau.

Finally, the system stores copy transmitted via portable terminals from reporters in the field. Additional terminals for use by editors in New York are expected to be installed next summer.

REQUEST FOR EAM MAINTENANCE PROPOSALS

The State of California will be requesting proposals to provide maintenance service for state-owned unit record data processing machines during the period July 1, 1977 through June 30, 1978. This equipment is located in many geographic areas throughout the state and individual contracts may be awarded by geographic area. For information regarding preparing and submitting proposals, contact Ike Bell, Department of General Services, 400 Capitol Mall, Room 206, Sacramento, CA 95814. (916) 322-3755.

The HP2645A Display Station is welcome news for your information network. For a very reasonable price, it provides the speed and versatility you need for network data entry.

The polling capability will help you reduce network cost by sharing communication lines, modems, and computer I/O channels. You can daisy-chain as many as 32 of these display stations throughout your head office, factory, or sales offices, speeding information to and from your computer at up to 9600 baud.

The eight "soft keys" let you personalize the HP2645A to specific job functions. For instance, you could assign one key to generate a computer log-on sequence and another to call up an order entry form. These "soft keys" are simple to program with each of them capable of storing up to 80 characters.

Even when the computer or data lines are unavailable, the extensive off-line data storage allows you to keep on inputting data. Each of two tape cartridges will store up to 110,000 characters of data, forms, and programs. These optional dual-tape units are integrated right in the terminal itself and can be specified initially or added at any time you desire.

The line drawing set is another useful option that lets you generate and store basic business forms so that you have only to call up the one you need and simply type in your new data.

This kind of convenience extends to the many editing features such as the character or line insert/delete. Accuracy is enhanced by the alpha/numeric field check, which signals with a tone if you have improperly entered an alpha in a pre-assigned numeric field or vice versa.

Another time saver is the self-test key. Press it and you will receive a tone indicating that the terminal is ready to operate. If a fault should exist, the 2645A helps you determine if the problem is in the terminal, communication line, modem, or computer by displaying a coded sequence.

The HP2645A has several other features worth considering when you're choosing a terminal. They include the easy-on-the-eye high-resolution display; plug-in modularity to ease and speed maintenance; and the inherent flexibility of the 2645A in interfacing with your network.

To experience the benefits and features of our new Display Station, give your nearest HP sales office a call. Or write us for more information.

HEWLETT  PACKARD

1507 Page Mill Road, Palo Alto, California 94304

For assistance call: Washington (301) 948-6370. Chicago (312) 255-9800. Atlanta (404) 434-4000. Los Angeles (213) 877-1282

42701HPT2





Here's why Digital's PDP-11/70 is the fastest selling supermini in the world.

In the short time that the PDP-11/70 has been offered, Digital has shipped over 1,000 of them. Customer applications include everything from laboratory research and education to extensive communications and commercial transaction processing.

What makes the 11/70 so popular? There are almost as many reasons as there are users. In conversations with a wide range of customers, four major reasons are repeated time and again: throughput, reliability, software and Digital itself.

"We went to PDP-11s initially because no other systems offered the price/performance. User response was so enthusiastic that we added more terminals and expanded to the 11/70. Our users love it. Reliability has been exceptional." ... D.H. Casagrande, Manager, Corporate Systems, ATCO Industries, Ltd.

The 11/70 is a very powerful computer, designed throughout to handle more data far faster than machines costing 5 times as much. It's supported by an outstanding selection of software. And since it's made by Digital, you can expect the highest quality, reliability and support services.

"We have a highly challenging mix of computing requirements. The 11/70 has come through with flying colors." ... Loren Gilmore, Corporate Manager of Engineering and Process Control Systems, International Harvester Company.

If you're wrestling with a mixed bag of computer needs, the PDP-11/70's your machine. It has an impressive variety of operating systems, languages, data management facilities and applications packages. It can handle real-time, timesharing and batch in any combination at the same time.

"We chose the 11/70 because it had all the tools we needed for a heavy transaction processing workload. And it's lived up to all our expectations." ... R.E. Umbach, Manager, Intercom Systems, Walgreens.

More and more organizations need a system that provides fast turnaround of up-to-the-second information to dozens of users simultaneously. The 11/70 gives it to them: the operating systems, the database tools, the communications and the raw operating speeds themselves.

"The 11/70's power was impressive, but it was primarily the software that sold us." ... Mel Culp, Systems Services Manager, Allis Chalmers Power Systems, Incorporated.

The PDP-11/70 comes with a choice of three major operating systems — IAS, RSTS/E and RSX-11 — that fit just about any operating requirements. Several languages, like COBOL, FORTRAN, BASIC, APL, DIBOL and RPG-II. And various data management systems, including multi-key ISAM and the only CODASYL-compatible Data Base Management System available in its class.

"There were only two companies that had the communications capabilities we wanted. On all counts the 11/70 was superior." ... Royle Vagle, Director of Data Processing, Cooperating School Districts of the St. Louis Suburban Area, Inc.

Digital is ahead of everyone in the area of data communication capabilities. There's the DECnet software that lets you communicate with a broad range of Digital computers, from micros to maxis, and a wide range of interfaces, terminals and services.

"Reliability was a critical requirement, and we got it. We've had only one machine failure in six months." ... Charles Holmes, Manager of Computer Services, Farinon Electronics.

Up-time, in fact, was one of the major goals in the 11/70's design. It started with the selection of the most reliable components tested under worst-case conditions. And culminated in a system where operations are continuously monitored by hardware or software. If you do have a problem, the 11/70 diagnostics and packaging make it one of the most quickly serviceable computers on the market.

"Digital had the system, the software, and the support. Their commitment has been solid from the outset." ... Gary Bernstein, Manager, Computing Systems, Biomedical Engineering Unit, McGill University.

To support all our hardware and software, we've created one of the world's largest support organizations. 5,000 people in 300 locations worldwide provide the very best software, educational, and service support.

"It was an easy decision. Both Digital and the 11/70 had an excellent track record. And they've both lived up to it." ... Raymond Neff, Director, Health Sciences Computing Facility, Harvard University School of Public Health.

For more information on Digital's PDP-11/70 call your local Digital representative. Or send the accompanying coupon.

Digital Equipment Corporation, Maynard, MA 01754. European headquarters: 81 route de l'Aire, 1211 Geneva 26. In Canada: Digital Equipment of Canada, Ltd.

digital

Digital Equipment Corporation, 146 Main Street, Maynard, Mass. 01754. Attention: Communication Services NR-2/2. I'm very interested in your PDP-11/70 system. Please send me your new brochure.

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

CW277



re·li·a·ble (rĭ-lĭə-bəl)

Definition 1: that can be relied on; dependable, trustworthy.

Definition 2: Vistar/GTX



It's one thing to have a display terminal that is recognized throughout the industry for its performance and reliability.

It's another to have it at one of the lowest prices in the marketplace.

Yet that's exactly what the new Infoton Vistar/GTX has to offer.

GTX is a Teletype® replacement with an 80-character line and 24 lines of information. Its interfaces, both EIA and current loop, are standard with backspacing and non-destructive spacing available at no extra cost. Delivery is now! (30 days ARO).

There's only one more thing you should know: the price. Only \$990 in quantities of 25.

Infoton

Second Avenue, Burlington, MA 01803 (617) 272-6660

For full facts, just contact any of the Infoton offices below:
 Bound Brook, NJ (201) 469-8188 · Gaithersburg, MD (301) 840-9270 · Compton, CA (213) 537-6767 · La Grange, IL (312) 352-8686 ·
 Atlanta, GA (404) 455-0600 · Scottsdale, AZ (602) 994-5400 · Bellevue, WA (206) 454-9332

Bits & Pieces

Simmons Elected President Of Amdahl Users Group

SUNNYVALE, Calif. — The newly founded Amdahl Users Group recently adopted bylaws and elected a slate of officers headed by Dr. Dick B. Simmons, president of IEEE Computer Society, as its president.

Also elected were John W. Lovin Jr., vice-president for DP at Liberty National Life Insurance Co., as vice-president; Mary Jo Mangan, associate director of Southwestern Ohio Regional Computer Center, as secretary; and David J. Blackwell, senior vice-president at Massachusetts Mutual Life Insurance Co., as treasurer.

Fifty-three representatives from all 27 Amdahl 470V/6 installations and four possible future installations were in attendance.

The next meeting is scheduled for late spring in Montreal. Additional information is available from Amdahl Corp. at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

Cartridge Cleaner Offered

TARZANA, Calif. — The Model 300 disk cartridge cleaner for use with both IBM 2315-type front-loading and 5440-type top-loading cartridges has been introduced by Innovative Computer Products.

The Model 300 sells for about \$1,000 from the firm at 18360 Oxnard St., Tarzana, Calif. 91356.

PSE Data Bank System Stores Microfilm, Cartridges

SUNNYVALE, Calif. — Project Support Engineering, Inc. (PSE) has introduced the Orbit cartridge data bank system to provide storage for 16mm microfilm as well as IBM and other magnetic tape cartridges.

The Orbit system can accommodate different types and shapes of 16mm film or magnetic tape containers in the one basic design by using a vertical filing method and varying the spacing between the two halves of the unit, PSE said.

The basic unit capacity is 50 cartridges; it is 24 in. in diameter and weighs 18 lbs. The cost of the unit is \$7,195.

An Add-On-Tray with a capacity of 50 cartridges is also available to expand the Orbit's storage. It costs \$3,195 from the firm at 525-C Del Rey Ave., Sunnyvale, Calif. 94086.

At Three Seminars

Soviets Share Data on Process Control

By Edith Holmes
Of the CW Staff

SAN FRANCISCO — Americans got a look last week at how the Soviets practice automated process control.

Three scientists responsible for the control systems used in modern Soviet chemical and metallurgical plants gave a seminar on those computerized systems here after putting on similar presentations in Pittsburgh and Houston under the auspices of Control Data Corp. [CW, Jan. 31].

The USSR hopes to move more of its technology from the research laboratories into products through cooperative programs and license agreements with the U.S., a CDC spokesman said. This series of seminars, the first scheduled for 1977, was designed to bring nonstrategic Soviet research to the attention of American businesses, he added.

Prof. Georgij G. Iordan, who heads the

Soviet team, has been involved in measuring and controlling variables in process subsystems for the past 30 years. Although many sensors have been developed in Iordan's laboratory, he discussed thin-film resistance strain gauge measuring sensors in particular at these seminars.

He and his lab claim they have developed a silicon-on-sapphire type of sensor with all the advantages of silicon-on-silicon and without some of the long-term deterioration factors. Some 7,000 of these sensors have been incorporated in automated control systems for chemical plants and thermal power stations in the USSR, he said.

Dr. Boleslav Volter took Iordan's developments and implemented them into the operation of a chemical plant in his discussion of an operational computer-based system in a high-pressure, low-density polyethylene plant.

Polymir 50, a polyethylene plant in Byelorussia in Novopolotsk, is the result of a joint effort between the USSR and the German Democratic Republic. A license for the design of the plant, which operates at a capacity of 50,000 tons per year, has been sold to Salzgitter, a West German chemical company.

The computer system at Polymir 50 was designed to provide a centralized data acquisition facility receiving 750 analog and 700 digital inputs; process the information and, using a mathematical model of the plant, develop on-line control actions; provide complete supervision of both the technical and economic performance of the plant; and allow for completely automatic startup, shutdown and changeover operations, Volter said.

The center of the system is based on the Soviet's third-generation computers, the M6000 and M7000, he explained.

Prof. Boris B. Timofeev described another automated control system built around these processors, a system designed for a steel-rolling mill in the Nizhny Tagil metallurgical combine.

Operative in 1975, this computerized control system has provided the mill with 1.5 to 2 times improvement in the precision of cutting steel beams. Throughput has been increased by 5% to 8%, providing an annual savings of 850,000 rubles or \$1.2 million and a payback for the control system within 18 months, Timofeev claimed.

All three men are members of the Scientific Management Group of the USSR Ministry of Instrument Construction, Means of Automation and Control Systems.

STC 8350 Disk Drive Designed As Replacement for IBM 3350

LOUISVILLE, Colo. — Storage Technology Co. (STC) has announced the STC 8350 disk subsystem as a compatible replacement for IBM 3350 disk drive units.

The subsystem can be connected directly to the Integrated Storage Control in IBM 370/145, 148, 158 and 168 CPUs or to an STC 8000 control unit, the firm said.

The STC 8350 features two disk storage spindles and can be operated in the native mode with 317.5M byte/spindle for a total of 635M byte/unit.

Other formats available include the 3330-1 capability, emulating two spindles of the 3330-1 (utilizing 200 of the 317.5M bytes available per spindle) and the 3330-11 capability, emulating one spindle of the 3330-11 (also utilizing 200M bytes).

Three Models

Three models of the STC 8350 are available: the Model A2, which contains control functions to operate a string of up to eight spindles; the Model B2, which contains no control function; and the Model C2, which may be substituted for one Model B2 in a string to provide an alternate backup control function to the Model A2 in the string.

Standard features include rotational posi-

tion sensing, an operator control panel switch to prevent accidental erasures, full track read and a dump restore software program.

Lease prices for a three-year period are \$1,200/mo for the Model A2, \$960/mo for the B2 and \$1,250/mo for the C2. Several lease plans are available.

STC is located at 2270 S. 88th St., Louisville, Colo. 80027.

Centronics Expands 7000 Series

HUDSON, N.H. — Centronics Data Computer Corp. has expanded its 700 series of printers with the addition of three models.

The microprocessor-controlled Model 703 is a 180 char./sec, 132-column logic-seeking printer.

It achieves throughput rates of 90- to 375 line/min and has a 15 in./sec slew rate, according to the firm. It also is capable of handling up to six-part forms.

The Model 780 and 781 were designed for 80-column applications. At 60 char./sec, the Model 780 achieves throughput rates of up to 90 line/min, the firm said.

The Model 781 prints bidirectionally at 60 char./sec, but through logic-seeking has an optimum throughput of 120 line/min, the firm added.

Both the 780 and 781 are small enough for counter-top application, Centronics said.

With a condensed print feature, they can utilize 132-column forms, a spokesman noted.

The low-end user prices for the 780 and 781 are \$1,510 and \$1,675 respectively; the 703 costs \$2,805. Deliveries are scheduled for the second quarter.

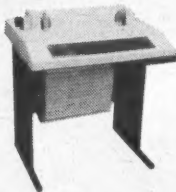
Centronics is located in Hudson, N.H. 03051.



PROVIDES YOU WITH A TEAM OF ALL-STARS!!!

For a Winning Performance...

digital



T 300-30-cps KSR Data Terminal

For Individual Excellence...

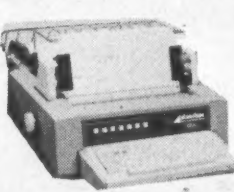
LEAR SIEGLER



Video Display — V 203-Glass Teletype & V 201-Editing Terminal

For Flashing Speed...

GENERAL ELECTRIC



T 1200-120-cps KSR Data Terminal

For Distance...

TELETYPE



T 133-10-cps ASR/KSR Data Terminal

For Staying Power...

TECHTRAN



S 500-110 to 2400-baud Mag-Tape Cassette Data Recorder

For a Strong Finish...

COMPUTER DEVICES



Miniterm 703 Portable KSR Terminal with Built-in Coupler

If you are trying to field a championship team in today's DATA COMMUNICATIONS arena, a team that excels in economy, efficiency, and reliability, enlist the All-Stars talent of ALANTHUS. We have challenged and surpassed the competition in costs and services.

You can sign our proven professionals with seasoned reserves as backup—for amounts less than, or equal to, the costs of untested or less capable contenders.

Best of all, you are never out of action when you sign with ALANTHUS; our nationwide SERVICE-CENTER and NETWORK of CUSTOMER SERVICE ENGINEERS is only a phone call away.

For additional information, dial your nearest ALANTHUS sales office or call toll free 800-638-4006.

Sales Offices: New York, Washington, D.C., Pittsburgh, Chicago, Detroit, Los Angeles, San Francisco, Dallas.

alanthus
data communications
Formerly Leasco Data Communications Corporation

ALANTHUS DATA COMMUNICATIONS CORPORATION
20030 Century Boulevard
Germantown, Maryland 20767
Telephone: 301-428-0500
TWX: 710-828-0086

Scientists Employing Mainframe To Investigate Spine Problems

CHICAGO — Scientists using engineering techniques and a computer are conducting research on back problems — research which may influence treatment for curvature of the spine, a disease that mainly strikes teenage girls.

To treat curvature of the spine (scoliosis), doctors frequently put patients in a hip-to-neck "Milwaukee" brace or, in extreme cases, surgically insert a rod in the spine.

Now, engineers at the University of Illinois here believe that, with the brace, stretching the spine helps less than applying pressure from the side.

"Too much force on the spinal column during surgical correction may hinder treatment," according to Dr. Albert B. Schultz, professor of mechanical engineering.

"For example, if you apply too much tension on a straightening rod, the hooks connecting it to the bone may break off or the bones themselves may give way."

Using mathematical models on an IBM 370/158, engineers studied the effectiveness of braces and other devices in treating scoliosis.

They found that braces helped by applying pressure in the midsection where the spine curves to the side. They also learned that the top of the brace holding the head and neck serves mainly to keep them centered over the pelvis.

Working With Orthopedists

"We don't know much about the sophisticated mechanical structure called the spine," Schultz said. "We're working with orthopedic surgeons to learn more about healthy and diseased spines in the hope of preventing and treating back problems."

"The effects could be far-reaching since eight million people in the U.S. alone suffer from back problems," he added.

The scientists are paying close attention to the use of braces in treating scoliosis. Half a million people wear braces to alleviate back ailments.

Using the mathematical model, the engineers predicted how the use of a Milwaukee brace would affect each patient's scoliosis.

They compared the predictions with actual treatment results and found that in 80% of the cases the computer-based predictions agreed with the actual results.

Engineering Principles

"By applying mechanical engineering principles to the analysis of the human muscle and skeletal system and simulating stressful situations, we may provide useful information in treating back troubles," Schultz said.

"We can gather information in a few days that otherwise might take 10 years to compile."

"Information on treatment of diseases such as scoliosis is important because we must know what effect rods and braces will have. For example, when is traction more important to correction than pressure from the side?"

Immediate Effect

"In the past, the lessons learned on one patient were applied to the next one. We hope our work will provide guides to make individual treatment more effective right

from the start," he added.

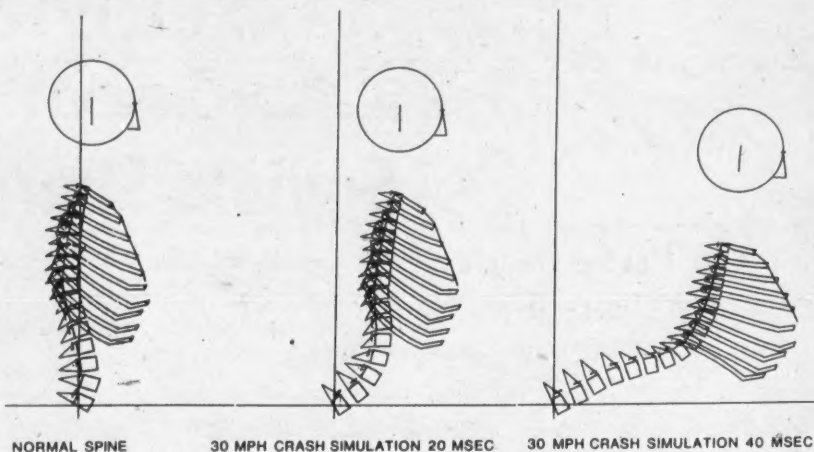
Research on spinal problems could be enormously helpful in private industry. Some 400,000 workers a year suffer back injuries and one-third of all workmen's compensation is paid for injury to the trunk area.

Safety, Health Standards

The University of Illinois researchers believe that explanations of why back injuries occur might help the government set standards for occupational safety and health.

In another study, Schultz and Dr. Ted B. Belytschko investigated spinal injuries sustained by fighter pilots during ejection from planes.

They simulated the response of the spine via the computer model. During ejection,



Scientists at the University of Illinois are trying to figure out what might happen to the human body in stressful situations — such as an automobile collision at 30 mph.

the spine is subjected to tremendous forces (above 2,000 pounds) because the pilot must be accelerated quickly to avoid hitting the tail of the plane.

The scientists found that helmet-mounted sights could increase the possibility of injury considerably since they caused the spine to twist.

**The end of the line
for rigid conduit computer installations!**

**VOLUME
KEY PUNCHING**
(402) 592-1686

**"QUALITY
AT
LOWER
COST"**

**AMERICANA
KEY PUNCH**
4345 South 89th St.
Omaha, Nebraska 68127

Operations Management — Part 2

Managers Must Initiate Problem Solutions, Goals

By Louis Fried

Special to Computerworld

There are successful data centers that have no user complaints. They exist in some sort of paradise financed by Saudi Arabian oil companies that can afford to provide the sort of overcapacity that goes with this scenario.

However, the rest of us who have to work with tight budgets or who are doing the best we can to obtain an optimum cost/performance ratio for our companies are working in a gray area, in which we are deliberately courting some element of risk in order to save money.

This situation won't change, and one of the keys to success for the operations manager will continue to be the skill with which he can provide the most bang for the buck.

Another area in which to look for paths to success is in dealing with the causes (not the symptoms) of complaints. If we look at the causes for complaints in data centers, some of the major ones are:

- Operational bottlenecks.
- Lack of good production control practices.
- Absence of standardized identification systems.
- Inequitable time charges.
- Incomplete personnel training.
- Improper hardware configuration.
- Poor physical layout.
- Inadequate operations management.

Each of these is within the primary area of responsibility of the operations manager. He must devise the cures and fight for the resources that will provide for changes and improvements.

There is another group of problems which cause complaints. These include production runs on inadequately tested systems, incomplete operational procedures, poor systems design, low programming or system design reliability and inadequate input forms and control documentation.

This is the second in a series of articles on the changing role of operations management.

Since these problems are caused by the systems or programming functions of the management information systems (MIS) department, they are not the direct responsibility of the operations manager. However, the operations manager must work with the managers of these areas to cure them.

One method is to jointly establish stan-

dards and review procedures that assure proper completion of the systems and programming task prior to production runs.

This does not mean that operations must continue the undeclared war with programming. In fact, just the opposite. One of the key routes to success for the operations manager is to stop this war.

The operations manager must combine the features of a businessman, a sophisticated technician, a systems analyst and a diplomat. He must preserve an aura of objectivity while conducting the "shuttle diplomacy" necessary to help the MIS director unite the systems, programming and operations areas in common purpose.

The next key to success is in establishing goals. Success, like progress, can only be measured against some standard. It is far better for the operations manager to propose the goals against which performance will be measured than to have them imposed.

Even if the MIS director has not formally established goals, it is important for the operations manager to set them.

Goals should be established in four areas: service, internal procedures, controls and hardware/software optimization.

Service goals should include the following:

- On-time delivery of batch jobs (measured from time of input to time of delivery to user).
- Provisions to aid program testing (improved turnaround, improved test library control, etc.).
- Special cost reductions (use of computer output microfilm or lower cost output).

In the area of improving operations procedures efficiency, the manager can examine internal procedures with the objectives of:

- Reducing operator work steps and improving work flow.
- Cleaning up existing job instructions and procedures with an eye to improvement.

These last items lead to further goals that can be established for enhancing overall control of job processing:

- Establishing a quality control function to assure the "processability" of input and the validity of output.
- Improving overall workload scheduling.
- Maintaining data base integrity and program security.

Finally, the increasing emphasis on cost control leads to the need for establishing goals to optimize hardware and software use. These include:

- Establishing a valid methodology for measuring hardware utilization and predicting future requirements (both hardware and software monitoring devices may be important to consider here).
- Developing standards for hardware and software performance (in terms of throughput or uptime, etc.).

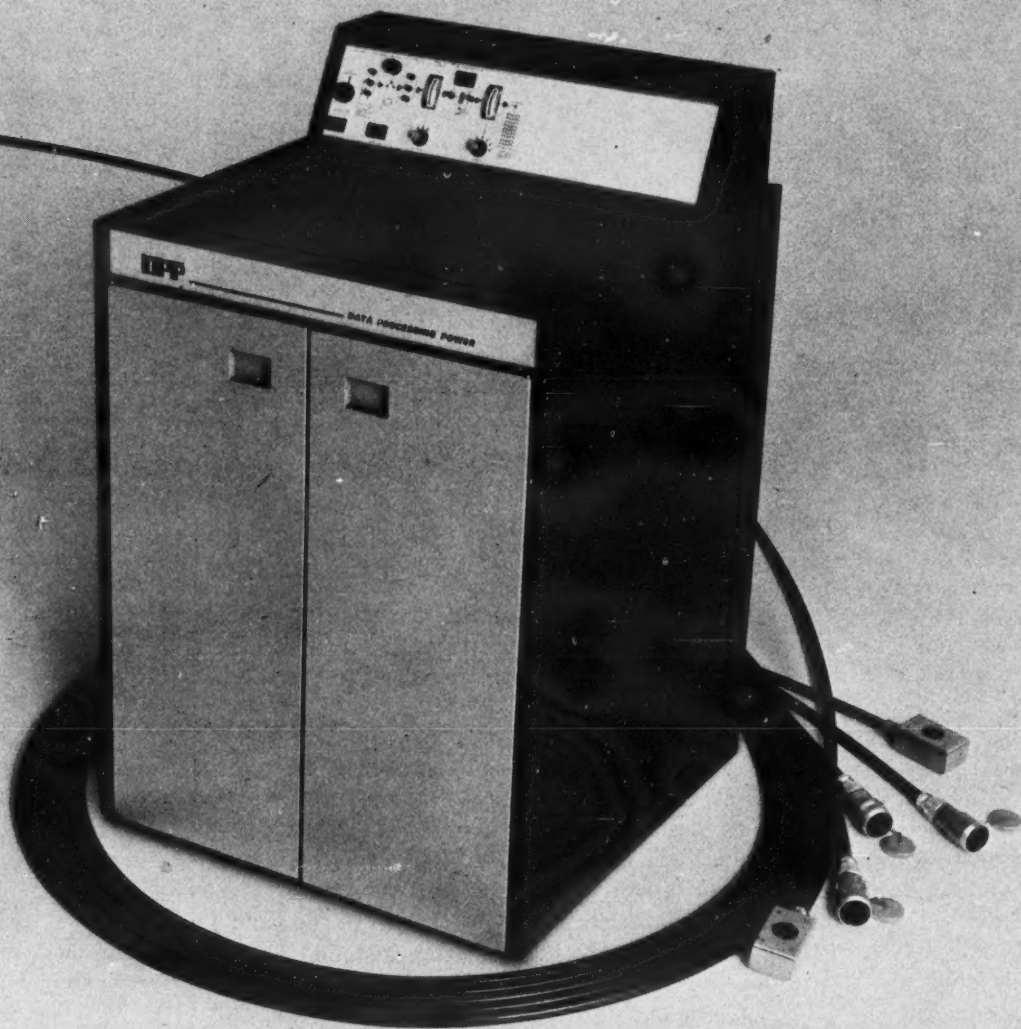
"Politics" is not a dirty word. It is a human condition that exists whenever people work together in groups. Politics for the operations manager can best be handled if confined to the MIS group.

Essentially, this means that political devices should be used in support of the executive to whom the operations manager reports.

The primary task of every manager serving the interests of self, superior and company is to assure the validity of the decisions made and actions taken by his superior. This does not mean merely advising when asked or reviewing and commenting on proposals made by others.

Instead, it means taking an aggressive approach to goal setting, to planning and to aiding in the solution of other managers' problems.

Fried is an independent consultant in Palo Alto, Calif.



A simple plug and a DPP Computer Power Center are all you need for safe, clean, flexible, mobile computer power...in a peripheral.

The DPP Computer Power Center is a revolutionary concept for controlling, monitoring and distributing safe, clean power to any computer system. Complete, self-contained with single-point ground and electrostatically shielded, isolation, step-down transformer, the CPC puts safe, clean power where it is needed—in the computer room.

Switching transients, voltage spikes, parity errors, loss of data, other "UFOs," and costly downtime are reduced to near zero. Flexible output cables replace and eliminate "hard site," rigid conduit wiring,

installation, and relocation costs—attach easily to all computer mainframes and peripherals.

Equipment can be located for efficient, economical operation—easily moved for system expansion or reconfiguration. The DPP Manager controls the computer facility. Installation, expansion, reconfiguration, even relocation of any computer system is now easily and economically accomplished. Just locate your equipment, lay out the flexible cables and plug in. Simple!

Contact us for more information about this revolutionary new system.

Data Processing Power, 14600 Golden West, Westminster, CA 92683, (714) 893-6578.

DPP

The DPP Computer Power Center
So Simple, It's Behind Its Time.

Supplements Guidance Counselor's Work

System Helps Lay Groundwork for Deciding on Career

GLEN ELLYN, Ill. — Students at the College of DuPage here are planning their education and careers with the help of a guidance program called Discover.

The computer-based program helps students explore occupations in terms of their personal values and interests. It lets them spend up to 20 hours answering the question: "What do I really want to do?" and then helps them find out what education and train-

ing are necessary.

Sitting at a CRT terminal, a student can rank-order his values, practice making decisions on possible career choices, compare his school grades with the requirements of certain careers and find out the training needed, where to get it, how much it will cost and where to find money to pay for it.

"The system supplements the work of a guidance counselor, but it doesn't replace the counselor,"

according to Dr. JoAnn Harris-Bowlsbey of Western Maryland College, codeveloper of Discover.

"Instead, the counselor can spend more time with a student evaluating specific plans after the system has helped the student assess personal values and interests, learn about occupations and develop a personal list of feasible occupations or educational institutions," she explained.

Project Discover is an outgrowth

of an earlier program called Computerized Vocational Information System and was funded partly by the Federal Government and partly by IBM.

One version (now complete) is for students in grades 7-12; another version for college students and adults, funded by the Exxon Foundation, is being tested at DuPage and will be ready in early 1978. James Godschalk, director of guidance at the college,

is supervising this test.

When a student sits at a terminal linked to the IBM 370/135, he has accessibility to descriptions of more than 1,500 four-year colleges and 1,000 two-year colleges, 500 occupations, 450 military training programs and 11,000 technical and specialized schools.

For Student's Convenience

"A student can use the system at his convenience throughout the school day," according to James Boyd, technical director of Discover at DuPage and codeveloper of the system.

"The system knows at what point a user signed off and never loses his place. A student can pick up where he left off or explore something else.

"As he proceeds, the system asks questions, then selects the proper information and guides the user through the program," he added.

"One benefit is that the system can search in depth for answers to questions. For example, a student might ask for a list of all four-year colleges offering forestry courses. Then he might limit his question to state schools west of the Mississippi River which offer scholarship help and accept average grades," he said.

Once a student learns to operate the system, he can choose among 20 different modules.

The elements include instruction in and simulation of decision making; learning group occupations and browsing among them; taking an interest inventory online and getting immediate feedback; making a personal list of occupations by use of values, interests, favorite school subjects or combined characteristics desired; being able to ask 21 questions about each of 500 occupations; and being able to search files of college and technical schools.

"This program is necessary because there aren't enough counselors for all the students who want help," Harris-Bowlsbey said. "Discover doesn't try to tell someone what he should do, but instead acts as a guide and storehouse of pertinent information on careers."

Discover is marketed and updated by Discover Foundation, Inc., a nonprofit organization.



All of your professional life you've wanted to say it. Really say it! Not just a CPU to a leasing company or some purchased peripherals, but the real thing—UP YOURS, BIG BLUE!

The Cambridge Systems Group now shows you the way with the first public offering of ASM2—the software DASD space management product that will knock your shoes off—give you the budget performance heroics you deserve—and make your IBM marketing rep a little less arrogant. Think of the private glee when you hand him the cancellation letter for a couple of strings! A peak experience!

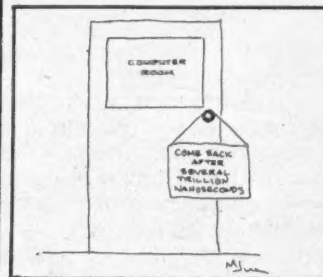
ASM2. Flexible, almost frighteningly powerful, fully automated DASD space management. The only space management system on the market today that is more than a collection of good-looking reports. ASM2 manages your disk space.

ASM2 is a business product. It has all of the wonders that make you look twice at commercial

software—unbeatable documentation, snappy installation, efficient resource utilization, absolute release independence, and of course, it will save you a lot of money.

ASM2 also has reputation and character. Over 150 of the largest banks, public utilities, oil companies, government agencies, and businesses like yours, own a perpetual license for ASM2—and we've never advertised until now! (Unlike our competition, we're a little embarrassed to actively promote a product that hasn't been proven in the field.) ASM2 has been reducing the IBM installed DASD base now for 36 months. We know it works!

Come on, you've been waiting for years. Call us and we'll show you how to give your very first, "Up yours, Big Blue!" (Also, if you'll send in the coupon, we'll send you our colorful (blue) poster for your office wall.) The Cambridge Systems Group, (408) 255-5727



The Cambridge Systems Group

P.O. Box 6267, Stanford, California 94305

Please send a Big Blue poster and information on ASM2 to

NAME

TITLE

COMPANY

TELEPHONE

ADDRESS

CITY

STATE

ZIP



(Your poster will be uncensored)

WANT TO BUY NEW OR USED

2 IBM 3288-2
With 445, 9089, 9944

Needed for Immediate Delivery

FOR SALE OR LEASE

IBM 370/145 Avail. June 1
IBM 370/135 Avail May 15

Call or Contact:
Phil Norton or Terry Schadoff
At (301) 229-3611
Federal Leasing, Inc.
4701 Sangamore Rd.
Bethesda, MD. 20016

Installed at Test Sites

First Univac BC/7 Users Like Programmerless System

By Esther Surden
Of the CW Staff

"We don't need a programmer on the payroll" was the reason one of the first users of the Univac BC/7 small business system selected the unit — a reason echoed by two other BC/7 users. The three users said they were generally pleased with the system.

The recently introduced BC/7 [CW, Jan. 31] has been installed at some test sites for several months, according to Univac.

"The information we had, from a management standpoint, was stale," according to Toby Koch, executive vice-president of Smith-Koch, Inc. So the Philadelphia distributor of pumping equipment decided it needed to get rid of its accounting machines and computerize.

"We visited five user sites with business systems by the better known companies. Some lacked the flexibility to put CRTs in the plant.

"One of the companies sold the hardware to a software concern and the software house took responsibility for both the hardware and software with maintenance by a service organization," Koch continued.

The user at that site said finger pointing had taken place on one specific problem, and Koch decided that a single source for all three elements was best for his company.

Koch heard about the Univac system through word of mouth and was willing to be a testing ground for it.

"The system lends itself to people who aren't familiar with computers," Koch noted, adding a language called Escort

permits the operator to write programs "without having to call in experts."

The firm's payroll, accounts receivable and general ledger applications are up and running. The system costs "as much as a secretary," Koch stated, and has allowed several of his employees to become more productive.

Producers Pride, an egg marketing cooperative in Worcester, Pa., installed its BC/7 in January and is "still in the process of getting it up and running," according to controller Don Regener.

Prior to going to the Univac system, the firm was using IBM unit record card equipment. "We were having trouble getting parts and good service," and began looking at small business systems including those from IBM and Burroughs, he recalled.

The company heard about the Univac system by word of mouth and decided to be one of the test sites. Presently, payroll is "ready to go," with other applications set to go on-line shortly, Regener said.

"We sent one of our people for about 24 hours of training," and that person "has enough working knowledge now to be able to run the system," he noted.

"The reason we can use existing personnel is that everything is formatted and shown in the English language, so we don't need a programmer on the payroll. This is not true on any other piece of equipment we looked into," he stated.

Robinson Halpern, a small manufacturer of transducers in Plymouth Meeting, Pa., installed the system to replace a totally manual system, with the exception of payroll which was being done at a service bureau, Bill McWhinnie, controller, stated.

"We wanted to conserve overhead" and get the accounting results faster, McWhinnie explained. "We did some shopping" and looked at the IBM System 32 and Digital Equipment Corp. Datasystem 310, but heard of the Univac system through word of mouth, he said.

"Price was a prime motivator," but we liked the fact that Univac was willing to use us as a test site. We felt they would be more than willing to assist us in case of any flaws," McWhinnie noted.

The firm received the Univac system in September and has about 80% of its applications on-line. "It is relatively simple to operate and we can use existing people," he added.

So far, McWhinnie continued, "we are very well satisfied" and any problems that cropped up have been quickly resolved.

Prime Adds Transact, CPU to Mini Line

By Esther Surden
Of the CW Staff

FRAMINGHAM, Mass. — Prime Computer, Inc.'s 500, the firm's top-of-the-line minicomputer offering to date, is said to have performance capabilities only available on medium-to large-scale systems.

The CPU was announced here recently as part of a series called "Transact," based on the firm's minicomputers and designed for multiuser environments for transaction processing and data base management applications.

A third instruction set has been added to the 500 CPU control store to make it appear as a 32-bit machine, a spokesman explained. Users can access this instruction repertoire with assembly language, he noted.

In addition, several already existing instructions have been enhanced including the floating-point processor and decimal arithmetic instructions, he said.

These enhancements will speed up the execution of Cobol and Fortran programs, he noted.

Error Correcting Memory

The 500 can accommodate up to 8M bytes of error-correcting memory and is software-compatible with the other members of the firm's line. Users can upgrade to the CPU by replacing several boards in their present CPUs, the spokesman said.

Like the 400, the 500 has an 80 nsec cache memory and main memory is two-way interleaved for faster throughput.

The system can support up to 63 simultaneous users with a mix of activities including program development, transaction processing, data base maintenance and remote job entry, the firm noted.

Three Transact models, called the T/3, T/4, and T/5, were introduced. The units

are oriented for medium-and large-scale applications, frequently involving off-loading and direct communication with mainframes, the company stated.

The Transact systems can communicate with each other using Prime's Primeret software and can handle remote job entry functions by emulating RJE protocols such as IBM 2780, Hasp and UT 200, it noted.

The firm also announced a data base management system, multiple index data access system and a forms management system. Cobol, Fortran IV and RPG-II are available for the system.

A typical T/3 system with a 300 CPU, 192K bytes of MOS memory, console, four asynchronous communications lines, 40M

bytes of disk, magnetic tape drive, 200 line/min printer with Cobol and RPG costs about \$100,000.

The T/5 system, costing about \$500,000, includes the 500 CPU with 1M bytes of interleaved error correcting MOS memory, console, 32 communications lines, two remote job entry lines, four 300M-byte disks, three magnetic tape drives, one 1,200 line/min printer and a card reader.

Cobol, RPG II, Forms, DBMS, RJE/2780 and RJE/Hasp are included.

The T/3 and T/4 will be available in March, while the T/5 and 500 CPUs will be available in mid-year, the firm stated from 145 Pennsylvania Ave., Framingham, Mass. 01701.

Firm Turns to Mini to Supplement Mainframes

MINNEAPOLIS — Sometimes, a large company with two IBM 360s sitting in the DP department turns to minicomputers to do the kind of interactive job the mainframes can't handle.

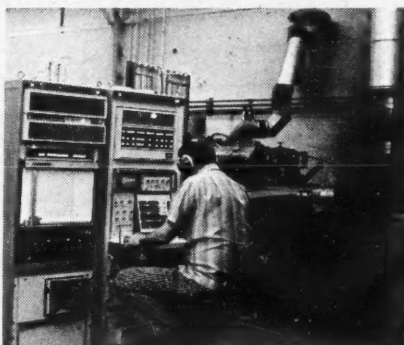
Donaldson Co., Inc., a manufacturer of exhaust and intake systems for the trucking industry here, turned to a minicomputer to match the right systems with the right vehicles to comply with federal noise regulations.

Replaced Time-Sharing

The mini replaced a time-sharing company, which was aimed towards business applications, according to Darryl Keller, computer specialist engineer.

"We felt we were underwriting packages we weren't using, he said. The time-sharing had also become expensive, with expenses climbing to \$120,000/year.

The minicomputer allows the firm to do all the applications it was doing before and



Engineer works at minicomputer at Donaldson lab.

more, he indicated.

Donaldson chose a Hewlett-Packard Co. (HP) system about two and a half years ago over the Digital Equipment Corp. PDP-11/45 and other systems on the

grounds that it was more cost-effective than the others.

Matching Operation

The matching operation is one of the more complex applications on the system, Keller stated.

"A few years back, one could simply look up a muffler system in a manual and, without too much trouble, recommend the right system for a given vehicle," he said.

Donaldson's system includes an HP 3000 Mini Data Center and two Fourier Analysis systems (HP 5451A and HP 5451B) controlled by two other HP 2100 minicomputers.

Muffler system selection at Donaldson works on a real-time basis. Company salesmen confronted with product recommendations in a customer's office connect a small attache case terminal by phone to the Data Center. The system compares vehicle

(Continued on Page 36)

Waiting For DEC?

**We'll meet your
disk storage needs
in 30 days A.R.O.**



We've become the world's largest independent supplier of disk systems for a lot of good reasons. Responsive delivery is one of them. Equally important is the unmatched performance per dollar we offer across our entire disk line—2.5 Mbytes to 1.2 billion bytes.

But don't take our word for it. Ask some of our recent customers: Bell Canada (RSX-11D on 300 Mbytes); Dictaphone (RS/TS on 80 Mbytes); Digital Information Corp. (Dual CPU, MRDOS on 300 Mbytes); Eastman-Kodak (RT-11 on 80 Mbytes); Lockheed (RSX-11M on 80 Mbytes); Stanford University (UNIX on 300 Mbytes). These are but a few of the satisfied customers we've helped with responsive delivery of large capacity systems. If you would like the names of others, just give us a call.

So stop waiting—and pick up your phone. A System Industries representative is waiting to tell you about the quick delivery and OEM pricing of disk systems with unbeatable price/performance.

**This is not a coupon, but a call to action.
Ask any of our customers about our responsive
delivery. Then secure your commitment from the
System Industries representative nearest you:**

Boston: Stu Oremland, (617) 492-1791. **New York:** Ron Caruso, (201) 461-3242; Bob Geise, (716) 385-3021; Al Levine, (516) 299-4272; Paul Margolin, (201) 694-3334. **Washington, D.C.:** Dave Jenoff, (202) 337-1160. **Cincinnati:** Gary McCabe, (513) 661-9156. **Los Angeles:** Steve Pricer, (714) 752-8904. **Houston:** Stan Coffee, (713) 465-2700. **Sunnyvale HQ:** Jim Winkel, Lynne Hodges, (408) 732-1650. **United Kingdom:** Pip Smith, Chris Ibbott, (4862) 70725.

30 days ARO

535 Del Rey Avenue
Sunnyvale, California 94086
(408) 732-1650, Telex 346-459

System Industries
An equal opportunity employer.



Just one of the many leading companies you'll see at

COMPUTER
EXPO 77

Featuring the Dataspeed[®] 40/4 data communications terminal, for private line systems using binary synchronous line control procedures. The Dataspeed 40/4 can be configured in cluster arrangements for a variety of interactive user applications.

Organized by:

**COMPUTER
CARAVAN
77**

The national computer exposition that's coming to you.
797 Washington Street, Newton, MA 02160
(617) 965-5800.

San Francisco • Los Angeles • Cleveland • Minneapolis/St. Paul
Chicago • New York • Philadelphia • Washington, D.C. • Boston. Starts March 29th.

Datapoint Packages 5500

SAN ANTONIO, Texas — Datapoint Corp. has reconfigured its 5500 system into two packaged batch business systems designed for stand-alone processing.

The systems allow small business users to take advantage of the firm's higher level programming languages, including Ansi Cobol, according to a spokesman.

Other available languages include RPG-II, Basic and Datapoint's Databus, Dataform and Scribe languages.

The Model 4523 with a 48K CPU, 5M

bytes of dual disk drive and a constant voltage regulator costs \$32,388 or \$1,009/mo on a two-year lease including maintenance.

The 4543 with 48K of memory, two 25M-byte removable disks and the voltage regulator costs \$52,107 or \$1,658/mo on a two-year lease.

Ansi Cobol is available for a one-time price of \$2,500 or a monthly lease of \$65.

The other languages are offered for "a small documentation charge," the spokesman added from 9725 Datapoint Drive, San Antonio, Texas 78284.

CDC Introduces Matrix Printers

MINNEAPOLIS — A family of microprocessor-controlled dot-matrix bidirectional printers for minicomputers is available from Control Data Corp.

The OEM CDC 9317 and 9318 can be

used with various minicomputers, according to the firm.

The 9317 is a bidirectional single print head unit that prints at 70 line/min over a full 132-char. line. It features a maximum print rate of 200 line/min when printing lines of 33 contiguous columns or less, a spokesman noted.

Uses Intel 8080A

The microcomputer, an Intel Corp. 8080A, is said to determine the closest position on the next line to start printing and direct the print head movement either left or right.

The 9318 has two bidirectional print heads, each of which covers up to 66 columns of the full 132-char. line, the spokesman said. Maximum printing speed is 125 line/min.

Both models use a cassette ribbon that snaps on and off the printer and include full-line 132-char. buffer memories.

The 9317 also provides for a 217-char. buffer for compressed format printing and can operate in an interactive mode, according to the company.

Up to Five-Part Forms

Both units also accommodate one to five-part forms, 4-in. to 16.7-in. wide and include forms thickness controls. Standard spacing is 6 line/in., but 8 line/in. can be selected.

Character pitch format of 10 char./in. is standard, but a compressed version is available, CDC noted.

The firm can be reached at Box 0, Minneapolis, Minn. 55440.

Prices begin at \$2,035 for the 9317 and \$2,535 for the 9318.

Firm Installs Mini To Supplement CPUs

(Continued from Page 35)

data with all Donaldson muffler systems, Keller said.

Among vehicle inputs required are vehicle make, cab type, engine model, single or dual exhausts, pipe diameter, fan noise data and exhaust system configuration.

Stored within the engineering data base are facts relating to airflow, temperatures, densities and back pressures of exhaust gases created by muffling. Starting with an unmuffled (straight pipe) condition, the system calculates sound pressure levels in decibels of various muffler systems and related back pressures.

Liquid Flow Math

The system also handles all of the firm's liquid flow mathematics. All of the programming for the system is handled in-house.

Keller expects the system to last the firm a long time.

"We are not even getting close to pushing the machines," he noted. "If I need to expand, I can add disks and if I need more expansion than that I can upgrade to HP's new system," he said.

The in-house interactive mini gave the firm the flexibility it needed to do the necessary job in a cost-effective manner, he added.

On-line updating and inquiry
Alternate logging capability
Protection of scratch and non-scratch status
Audit and inventory reports
Console sharing for multiple CPU's
Automatic scratching of tapes
Simple interface to OS
Scheduling and control of tapes being moved to off-site location
Automatic uncataloging of scratch tapes
Non-quiescing of tape jobs while backing up the master
Unchanged JCL for users
Non-degradation of system performance
PLUS — On-site training and installation — at no extra charge

TLMS Release 4		Other
Yes	✓	Yes
Yes	✓	No
Yes	✓	Yes
Yes	✓	Yes
Yes	✓	No
Yes	✓	Yes
Yes	✓	No
Yes	✓	Yes
Yes	✓	No
Yes	✓	No
Yes	✓	No

What You Want From A Tape Library System — You Get From TLMS Release 4.

For more information, write or call:

Gulf Computer Sciences, Inc.
1775 St. James Place
Suite 160
Houston, Texas 77056
Tele. (713) 627-9320

For School Children

Mini at Heart of Chronic Disease Prevention Program

By Steven D. Stellman

Special to Computerworld

A dedicated minicomputer system is at the heart of a school program designed to prevent heart attacks and cancer later in life.

The "Know Your Body" (KYB) program, developed by the American Health Foundation (AHF) and being implemented in junior high schools in New York City and Westchester County, aims to identify and control risk factors among children aged 10 to 13.

A risk factor is a health condition or habit, such as high blood pressure, smoking and high serum cholesterol, which can eventually lead to disease. One of the research premises studied by the foundation is that a healthy child who exhibits one or more of these risk factors is more likely to eventually develop heart disease than a child without them. The minicomputer system is a major tool used to investigate that premise.

The KYB program employs health screening for risk factors as a means of personalizing the health education course given in schools. A key factor is the rapid return of screening data to the children, parents and family doctors, pinpointing possible areas of risk and at the same time strongly motivating the children to adopt healthy lifestyles to reduce risk, such as not smoking and cutting down on fatty foods.

The system, configured by Ball Computer Products, Inc., consists of a Data General Nova/2 with 32K core, a Hazeltine 2000 terminal, a Dynex 6222-T dual drive disk with 5.2 M bytes fixed and 5.2M bytes removable storage, a Wangco tape drive and a Centronics printer. A Ball Computer Products 6500 optical mark reader (OMR) driven by the minicomputer reads, interprets and stores on disk up to 12 page/min.

Fortran-coded OMR routines permit on-line logical checking of OMR source data, and internal data conflicts or multiple marks can direct automatic feed mechanism to send the current form to the reject hopper.

Health Knowledge Evaluated

At each school, each child mark-sense encodes his name, age, birth date, grade and sex and answers a 52-question "Health Knowledge Examination" (true or false: Smoking is a leading cause of lung cancer). The forms are read by the OMR and are immediately scored by the Nova. The child's name and results are printed on an adhesive label, which is then returned to him affixed to a message describing the next segment of KYB: the health screening test.

With parental consent, a screening exam is administered in the school by AHF's registered nurses and medical technicians. Scheduling is handled by special class master list forms produced by the system. The screening covers height and weight, blood serum cholesterol, blood sugar, hematocrit, blood pressure and a physical

MCS Voice Response Unit For HP 21XX Mini Service

SUNNYVALE, Calif. — Microcomputer Systems Corp. (MSC) has a voice response unit on a single card for the Hewlett-Packard Corp. (HP) 21XX series of minicomputers.

Called TT/VRU, the unit accepts Touch-Tone signals and converts them to Ascii code for presentation to the system. The voice response unit produces either male or female speech of up to 24-sec duration, according to a spokesman.

The unit requires one I/O slot and decodes a 3-row by 4-column Touch-Tone. It interfaces directly to the Bell System data access arrangement, the spokesman added.

The TT/VRU unit costs \$2,450 from the firm at 440 Oakmead Parkway, Sunnyvale, Calif. 94086.

fitness test.

Each child's record in the master data file is ultimately compiled from four separate source documents: Health Knowledge Examination and Health Habits Survey, both mark-sense encoded by the children themselves and entered directly on the OMR; consent forms on which parents fill in their own names and doctors' names; and clinical screening forms.

A screening form for each child is partially encoded by an AHF nurse during the physical exam and is completed by AHF's own laboratory personnel who evaluate the blood chemistry at the AHF-Naylor Dana Institute for Disease Prevention in Valhalla, N.Y.

Data collected during screening and laboratory blood results are used to produce three kinds of output: a "Health Passport"

for each child, summarizing his results, to be updated at each year's follow-up; a letter to parents listing the child's results and flagging abnormal findings; and a letter to the family doctor.

One vital role played by the minicomputer system is to speed the turnaround time, so the children receive their own results with the screening experience still fresh in their memories.

The biostatistical data accumulated and stored by the system is organized for further scientific analysis by the AHF research staff. A special statistical program library for the Nova system, modeled on statistical packages ordinarily found only on larger mainframes, has been developed.

Such essential statistical tools as frequency distributions, multidimensional cross-tabulation, regression and correlation

are in constant routine use. When more highly sophisticated tasks are required, such as discriminant or factor analysis, the raw data is taken via tape to a nearby university's CDC 6600.

The foundation has established a significant risk factor data base with this study. So far, 4,500 students in grades six to eight have participated in the KYB program and more are being added each year.

Results show that about one-fourth of all students screened have at least one abnormal result: more than 12% were overweight, 17% had elevated cholesterol and 2% had high blood pressure. An alarming 10% of all students are smoking regularly and of those the girls outnumber the boys.

Stellman is head of the biostatistics section for the American Health Foundation.



Background photographed near Dornie, Scotland.

U.S. Patent No. 3,692,255. Born in the clan.

Scotch® brand data cartridges are the best choice for your cartridge system for a number of reasons. Because we invented both the cartridge and the drive back in 1971. Because we make more of these data cartridges than anyone else in the world. And because our Scotch brand label is backed by the most experienced producers of magnetic recording media. A dedicated team of research experts, production specialists and sales and service technicians. The 3M Clan.

Scotch data cartridges are available worldwide from 3M and from leading data products suppliers who've joined our clan.

Whatever brand of cartridge system you're using, Hewlett-Packard, IBM, Tektronix or others, Scotch data cartridges are compatible.

For more information, write: Data Recording Products Division, 3M Company, P.O. Box 33255, St. Paul, Minnesota 55133.



Count on the clan.

3M
COMPANY

Compare...
BASF offers you
a 30% saving,
lifetime guarantee,
free field service,
and immediate delivery.



The first name you think of in computers may not be the best choice in data modules. While still completely compatible with existing 3340 drives, BASF data modules cost far less than the drive manufacturer's modules, are guaranteed for as long as you use them, offer free field service, and are available for immediate delivery nationwide.

Before you write your next order for data modules, find out why BASF has more to offer.

Call our nearest regional office: in Bedford, (617) 271-4007; in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J., (201) 546-9111; in Dallas, (214) 233-6607; and in Montreal (514) 341-5411.

BASF The Original.

Computer Tapes Disk Packs Flexydisks Word Processing Supplies

Dedicated Mini Improves Auto Parts Firm's Cash Flow

HYATTSVILLE, Md. — If cash flow is the lifeblood of a small business, then a dedicated minicomputer might be called the heart that pumps it.

This is the view of Martin Goldfarb and Martin Chevalier, owners of C&G Sales Co., an automotive warehouse distributorship here. The firm replaced its manual inventory records in May 1975 with a turnkey minicomputer system when it became apparent that the hand-posted cards were too cumbersome to work with.

"Already the system is paying for itself," Goldfarb said. "It's improved our cash flow in a number of ways, and we're looking forward to further improvements as we expand the system to do other things."

C&G Sales deals strictly in rebuilt parts such as starters, generators and brake shoes. The firm carries an inventory of 4,000 part numbers and sells to 250 jobber accounts in Maryland, Washington, D.C. and Virginia. It processes some 800 to 900 inventory transactions daily, according to Goldfarb.

C&G's minicomputer, a Digital Computer Controls Model D-116, is the nucleus of the Business Information System (BIS) supplied by Scientific Measurement Systems, Inc. (SMS) of Cherry Hill, N.J. The system also includes two CRTs, 10M bytes of on-line disk storage and a 60 line/min printer. Four additional CRTs and a second printer can be added to the system.

Software consists of an operating system, Interactive Business Oriented Language (Ibol), which accepts application programs written in interpretive statements. A multiprogramming capability allows system time-sharing by up to eight users.

'Real Eye-Opener'

Neither of C&G's partners had any previous DP background. However, they were motivated to look into minicomputers after

seeing a chance demonstration of one in action. "It was a real eye-opener," Goldfarb said. "It frightened me to realize how little I knew about my business."

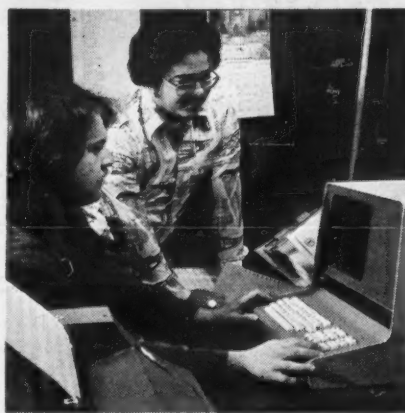
The two men talked to several manufacturers and visited a number of user sites before settling on the SMS system. "A lot of companies have good hardware but no knowledge of the auto industry. We liked what we saw at SMS, and they had a good background in our business, so we went with them," he explained.

The transition from a manual to an electronic system took less than a week with no serious hitches, Goldfarb said. Inventory records now take the form of a CRT video display containing information fields which were specified by C&G. The inventory record format, although fixed within the system, can be modified should C&G wish to change its format in the future, he noted.

"We can add new information fields to our inventory record or change the size of existing ones. It gives us the best of both worlds," he said. "Shortly, we'll have billing and accounting on the system too. But we wanted to get our inventory down pat first."

"We use the system as an all-around management tool. We use it for purchasing, for making stock adjustments, for returning merchandise and as a sales tool as well. It's cut our inventory significantly and made it much cleaner and more saleable. In the last six months we've increased our business by 26% on basically the same dollar value as before. Again, we can predict cash flow much better. When we write a purchase order on the system, it prices out the order so we know exactly how much money we're going to be spending," Goldfarb said.

To analyze inventory movement, the distributor keeps an extensive sales history of every part in stock. As each sale is posted to its respective inventory record, sales his-



Martin Chevalier and Steve Earley inquire about inventory at C&G Sales Co.

tory fields on the record consisting of the current two-week, four-week, six-week, 60-day and 90-day periods are updated. Also kept on the record are sales figures for the two preceding 30-day periods. C&G runs a printout of a given vendor line keyed to any of these sales fields to see how many of each item were sold within the selected period.

Previous Procedure

Prior to obtaining BIS, the firm's general manager, Steven Earley, had to write purchase orders manually by pulling each card from the file and checking it, by examining sales records and sometimes by scanning the warehouse shelves to get his information. "Now the computer's got the sales history in it and I just tell it to order to a given sales period and it generates the order in five minutes," Earley said.

Goldfarb added that he likes the "cold, calculating way the computer looks at things and makes decisions in which emo-

tion and past prejudices have no part." He said he overordered a particular part for years without realizing it. "Every time I came to it, I'd tell myself we sell a lot of these so I'd better order 75. But since the computer has taken over, it only orders 10 or 15 because that's all we really sell. The system orders strictly on sales history, not on what you think you've sold. We've eliminated a lot of false ordering."

Complementing the turnkey system's purchasing routine is a posting procedure for receiving the ordered goods into inventory. Working from a copy of the shipping document, the inventory clerk posts individually those items on the manufacturer's invoice which were not received.

The remainder of the original order is stored in the system and thus gets posted automatically. Following that, a printout is made of the received items and their extended costs, which the clerk compares with the manufacturer's invoice.

Ultimate Goal

Since C&G handles only rebuilt, or core, items, its ultimate goal is to insert a core ledger into the system. Goldfarb explained that a core item is one having a deposit value and that there can be several different values attached to each part type.

Because of this, it is necessary to keep detailed records of all customer purchases and returns to ensure that each customer's core account is properly credited and debited. The same requirement holds when C&G passes its collected cores on to manufacturers for credit against the purchase of rebuilt stock.

"With seven vendor lines, 250 customers and some 60 core categories, keeping track of these records manually just got out of hand," Goldfarb said. The company expects this facet of its system to be ready within the next few months.

Another good reason for taking part in the 1977 Computer Caravan:



Qualified computer buyers are looking for practical, new products at the Caravan.

The 1977 computer buyer is an important individual looking for viable solutions to a host of problems. His workload has increased, his deadlines are tighter, and it's his responsibility to see that the DP center meets the organization's rising expectations.

That's why thousands of computer buyers from all over the country are planning to attend the 1977 Computer Caravan. They'll be there to gather information about a variety of products and services that can help solve specific problems at their installations, evaluate the companies that supply them, and select the ones that best meet their needs.

If you're marketing computer products or services, then you should be part of the 1977 Computer Caravan. How else could you meet more than 30,000 computer buyers across the country in just ten short weeks?

For complete information on how the Caravan can work for you, write us. Just use the coupon, or call Roy Einreinhofer at (617) 965-5800.

NINE COMPUTER SHOPPING CENTERS THAT BRING THE BUYERS TO YOU

San Francisco, Los Angeles, Cleveland, St. Paul, Chicago, New York, Philadelphia, Washington, D.C., and Boston.

To: Roy J. Einreinhofer
Vice President, Marketing
The Computer Caravan
797 Washington Street
Newton, MA 02160

**COMPUTER
CARAVAN
77**
Sponsored by COMPUTERWORLD

☐ Please send me more information on exhibiting in the 1977 Computer Caravan.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone(____) _____

Numerous Issues Still Unresolved

Vendors and Agencies Alike Suspended in TSP Limbo

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Ten months have passed since 46 firms submitted their bids to be included in the General Services Administration's (GSA) Teleprocessing Services Program (TSP).

Only seven companies have won approval to market their teleprocessing goods to federal agencies, and at least another month will pass before selection of interactive and remote batch services from the schedule becomes mandatory.

In the interim, teleprocessing companies and government agencies alike have been left hanging, according to Terry Miller, president of Government Sales Consultants, Inc.

While the GSA has extended its four-year-old contract with Computer Science Corp. (CSC) for Infonet from its expiration date last June 30 until September 1977 with the potential for agencies to continue their use of the network for an additional year, this contract extension applies only to existing agency applications.

The GSA isn't sure when TSP will get under way, according to Michael Muntner, assistant commissioner of assistance for agency planning and policy. Perhaps it will get under way in March, when "a couple of dozen companies" are on the schedule and capable of covering 75% of the business the government has to offer, he said.

Of the government market, 55% is said to be covered by the seven firms now on the TSP schedule.

Worth between \$50 million and \$80 million to the group of firms that become prequalified, renegotiated vendors to the federal agencies, TSP was created to fill the eventual expiration of the GSA contract with CSC. In addition, the program satisfies an increased emphasis within the Federal Government on DP services provided by the private sector, Miller said.

The firms already on the TSP contract schedule — Rapidata, Inc., Information Consultants, Inc., Informatics, Inc., Computer Network Corp., First Data Corp., United Computing Systems, Inc. and CSC — believe the market for teleprocessing services within the government will open up [CW, Dec. 20].

The agencies, however, can't lose, while the vendors are taking a gamble because the amount of business currently available to them is limited, Miller suggested. He compared the vendors' situation to a game of "musical chairs" in which there are only a

limited number of seats.

If, as the Office of Management and Budget estimates, the sale of teleprocessing services to federal agencies will be a \$200 million business by 1980, then the TSP vendors will win and only the hardware vendors will stand to lose very much, Miller said.

Benefits for Agencies

GSA's TSP will make it easier for an agency to contract for teleprocessing services and, by going outside, the organization will find itself on the air sooner than it would with a normal hardware bid, Miller said.

TSP requires volume discounts for the entire government, discounts from which the agencies will surely derive benefit, he added.

The agencies will be able to expand and contract their workloads more easily and can be assured of networks that are reliable and in place, Miller concluded.

Even given these advantages, it won't be all peaches and cream for the federal agencies who go looking for teleprocessing services under TSP.

Agencies will have to learn how to write

good specifications for the tasks they need done, how to benchmark those services which seem to qualify for the job, and how to compute the life cycle cost of the system they want, whether they choose the TSP or depart from it and open their search through a full-blown request for proposal (RFP) to the teleprocessing industry at large, Miller said.

In addition, agencies will have to determine and then face the cost of benchmarking.

Miller suggested there is little guidance within the present government regulations on how to go about acquiring teleprocessing services under TSP.

Vendors 'In Trouble'

The vendors, however, "are in trouble," Miller said. "Very few of the vendor personnel involved in these negotiations have ever done GSA schedules before," he explained.

"As a result, GSA has been able to convince all of them to accept everything in the RFP in spite of the fact that everything in the RFP except matters of law is negotiable."

Aside from the volume discounts they

must offer in order to be placed on the schedule, the vendors currently are not allowed to change the algorithms they use to compute the price of their teleprocessing products without advance GSA approval, Miller noted.

These algorithms take into account the storage a customer uses, the CPU instructions required and the I/O used to transfer data, he explained. Every vendor has his own algorithms to compute the bill for any given job, and every time the hardware or the software of his system is changed, the algorithm must be altered or either the vendor or the customer will suffer, Miller said.

What the GSA wants is the price for throughput to stay the same for the life of its contract with a vendor. Instead of telling the vendors they must keep their algorithms constant, the administration must develop benchmark programs to determine the baseline charges for a service and run these programs on the vendor service whenever the firm wants to change its algorithms, he suggested.

In the optimum situation, the administration should test the vendor to make sure by changing the algorithm the vendor hasn't

(Continued on Page 42)

Both Here and Abroad: ADL

Installed Base Seen Hitting \$70 Billion in '81

By Toni Wiseman
Of the CW Staff

CAMBRIDGE, Mass. — The general-purpose computer industry will enjoy a 9% compound annual growth in the U.S. installed base in the next five years, according to a recent report by Arthur D. Little, Inc. (ADL).

From an installed base estimated at \$46.5 billion at the end of 1976, ADL projected growth to \$70 billion or \$75 billion in 1981 (in current dollars, including a general inflation rate of 4% to 5% per year).

The overseas installed base is expected to grow 12% annually, from \$40.9 billion to \$70 billion to \$80 billion, the report said.

Frederic G. Withington and Oscar H. Rothenbuecher, who directed the study, supported their optimistic forecast by citing the computer industry's excellent showing for 1976 "in the absence of major new products."

They attributed their expectation for the sharp upturn, better than originally an-

ticipated, primarily to a resurgence in customer demand following 1975's recession-induced order delays.

Other factors influencing their forecast included the continuing trend to simplify complex applications for users, the burgeoning of electronic office and funds transfer systems and the growing use of computers to offset inflation in labor-intensive industries.

Computer shipments have become more sensitive to economic cycles than formerly, Withington and Rothenbuecher noted. If there is a recession in the 1978-1980 period, as some economists forecast, computer shipments will be affected, they said.

Mainframes Won't Be Deposed

The ADL study challenged the belief held by some experts that the big "centralized monsters" are about to be deposed by the increasingly popular distributed minicomputer networks.

User desire for a high level of software ca-

pability will continue to require the use of general-purpose computers, Withington maintained.

And, he said, while distributed networks of smaller computers will have some impact on shipments, particularly of machines in the \$1 million to \$2 million purchase cost range, the two types will live side-by-side for years to come, with most networks dependent on a large central "host."

"The big general-purpose machines have a 20-year head start on systems programs," Withington explained. "Small computer networks are not likely to be able to offer equivalent convenience, versatility and stability until the early 1980s."

"After that, the dominance of large computers may wane, but an 'Indian summer' of growth and profitability for them appears likely in the interim," he stated.

ADL estimated the gross value of general-purpose computer system shipments in the U.S. rose 20% to \$7.7 billion in 1976 over

(Continued on Page 42)

Twice the performance of a 370/158 at one half the price of a 370/168. 370/165—the logical choice.

It's only logical that the leading remarketer of IBM systems can offer such price performance. Re-think your hardware decision and re-think about a 370/165. It's the logical choice.

Re-THINK

Write today or call your nearest Comdisco office

COMDISCO
THE LOGICAL CHOICE

9701 W. Higgins Rd. Rosemont, Ill. 60018 (312) 698-3000

Atlanta (404) 256-5956 • Fort Worth (817) 534-1774 • Minneapolis (612) 854-8107 • New Jersey (201) 568-9666 • San Francisco (415) 944-1111

With Recent Announcements

HIS Makes Formal Commitment to Distributed Mart

By Toni Wiseman
Of the CW Staff

NEW YORK — Honeywell Information Systems, Inc.'s (HIS) introduction of an impressive variety of equipment here recently [CW, Jan. 31] marked its formal commitment to the distributed systems marketplace.

The announcements included the 66/85 large-scale system; 64/60, 64/53 and 64/30 medium-scale processors; Datanet 6678 front-end processor; DST 6/500 intelligent terminal; RBT 6/301 and 302 remote batch terminals; and support of a standard bit-oriented protocol, High-Level Data Link Control (HDLC) [CW, Jan. 31].

The introduction of an expanded, top-of-the-line array of Series 60 systems and related communications capabilities represent "a midpoint between the introduction of [the] Series 60 systems and their implementation in the sophisticated distributed networks of the 1980's," according to Edson W. Spencer, president and chief executive officer.

Spencer pointed out that of all the manufacturers operating today, only HIS has designed, produced, sold, installed and serviced both general-purpose and minicomputer systems for well over a decade.

In addition, of those in the industry who now offer such an extensive product line, only HIS is an influencing force in both the information systems and controls systems markets, he said.

"As a result, Honeywell has a unique blend of products, experience and know-how to provide the kind of sophisticated distributed processing capabilities — ultimately including process control and sensor-based systems — that we anticipate will be an evolving market requirement," he added.

Unique Concept

HIS's concept of distributed processing, what they term the Distributed Systems Environment (DSE), differs from that of IBM and others in that it focuses on a product strategy rather than a communications architecture.

DSE refers to two or more processors — capable of altering the content of data or managing data files, not simply transmission or communications devices — operating on an organization's data in a cooperating manner, Clancy W. Spangle, president, stated.

The significance of DSE lies in its "flex-

Independent Advisers Form Non-Profit Organization

ST. LOUIS — Independent consultants here have formed their own not-for-profit organization in order to provide themselves with group-type benefits.

The Independent Computer Consultants Association (ICCA) provides its members with group medical, life and disability insurance while allowing each consultant to retain complete independence in his job, according to Steven A. Epner, president.

Further information is available from ICCA, P.O. Box 27412, St. Louis, Mo. 63141.

ibility," he noted.

"DSE is not a rigid framework around which the user's operation must be built; rather, it is a flexible environment within which he is free to establish his own configuration."

"But flexibility alone is not enough," he warned.

"With multiple computing centers autonomously operating under their own procedures and protocols... control is also a major requirement," he said.

For HIS, this means the ability to compile on one machine and execute on another, a common set of data structures, a common set of protocols, local transaction capabilities and file transfer capabilities.

Spangle pointed out two essential design considerations behind the line concept of the Series 60, including the Level 6

minicomputers: easy upgrading into Series 60 and expansion within the series, and the ability of coexistence in networks calling for different levels of processing capabilities at different locations.

"What we now offer our users is an overall approach to distributed processing that gives them considerably more flexibility in meeting their own requirements."

"What we will have is a true distributed systems capability: common data base, common protocol, expanded transaction processing and compatibility and cooperation among system components," Spangle stated.

"We are going to proceed deliberately, relying heavily upon user experience throughout what are sure to be an important next few years."

"We won't offer distributed processing

systems that represent the limited vision of 1977. But, quite simply, we are offering distributed systems that reflect where our users are today and where they want to be tomorrow," he added.

HIS's new products represent an evolutionary direction, dedicated to the needs of today, with emphasis on host systems with mini-based network elements, according to Richard R. Douglas, vice-president of marketing and services, Information Division.

The future of distributed systems is a bright one, he noted, citing indications that the U.S. market for distributed computer systems will exceed \$5 billion annually by 1980.

This will represent approximately one-third of that year's estimated hardware shipment value, he added.

The GE TermiNet*30 if you think its speed is special... wait 'till you discover the flexibility.

And economy when you lease it from RCA

The new GE TermiNet 30 mag tape ASR matrix printer... gives you the speed you need. Dashes off 30 characters per second. But time isn't the only thing you'll save. You'll save money and trouble, too! It's simply more economical to lease the TermiNet 30 matrix printer from RCA.

And with RCA's nationwide service to back you, it's a lot more sensible. The RCA lease price includes maintenance by RCA data communications specialists based in over 140 cities nationwide. Seven warehouse locations coast-to-coast ensure fast delivery and prompt installation.

The TermiNet offers many features including:

- Prints at 10, 20 or 30 cps
- Transmits at speeds up to 1200 Baud
- Single cassette magnetic tape; stores 100,000 characters
- Versatile editing capability
- Answerback (supplies 20 characters)
- Vertical tabulation and form out
- Adjustable pin-feed platen 4"-9½"
- Data-Phonet (Dial-Up) capabilities
- Permits terminal use with data access arrangement (DAA), Type 1001B CBT
- Ribbon cartridge—a snap to install. Your operators will love it
- 300-Baud originate—only integral modem
- Interface options
- 8-level ASCII code

This Magnetic Tape unit adds the capability of off-line data preparation, local recording and storage of data for archives, as well as high-speed data transmission. Mag tape also has the advantage over paper tape of being reusable.

For full details and rates call or write:

RCA

RCA Service Company
A Division of RCA
Technical Services

Bldg. 204-2
Camden, N.J. 08101
Phone: (609) 779-4129

4508 Bibb Blvd.
Tucker, Ga. 30084
Phone: (404) 934-9333

43 Edward J. Hart Rd.
Liberty Industrial Park
Jersey City, N.J. 07305

7620 Gross Point Road
Skokie, Ill. 60076
Phone: (312) 965-7550

1501 Beach Street
Montebello, Calif. 90640
Phone: (213) 685-3069

3310 South 20th Street
Philadelphia, Pa. 19145
Phone: (215) 467-3300

20338 Progress Drive
Strongsville, Ohio 44136
Phone: (216) 238-9555

Phone:
(201) 451-2222 (N.J.)
(212) 267-1550 (N.Y.)

2711 Irving Blvd.
Dallas, Texas 75207
Phone: (214) 631-8770

* Registered trademark of General Electric Company.

† Registered servicemark of AT&T.

Decprinter

LA 180
\$2,645

Decwriter

LA 36
\$1,610

Immediate Delivery
Southern Sys, Inc.
201-725-0700
(305) 561-5226

With Introduction of BC/7

Univac Hoping for Slice of First-Time User Pie

By Esther Surden
Of the CW Staff

NEW YORK — With the introduction of its BC/7 small business system [CW, Jan. 31], Univac joined the ranks of mainframers going after a piece of the first-time user pie.

The company, after investing three years and nearly \$25 million in the project, decided this market demands solution-oriented selling and single sources for maintenance, hardware and software, Gerald G. Probst, president, said.

The BC/7 is being pitched against the IBM System 32 and the Burroughs B80 as well as offerings from NCR and Digital Equipment Corp., according to A.R. Dietrich, manager of marketing development.

Univac studied the first-time user market in some detail and decided that if hand holding is what the user wants, that's what he'll get. The firm has recruited sales and support personnel to market the system separately from the mainframe sales forces, according to A.W. Fera, vice-president and general manager of the Office Equipment Division.

Initial target industry markets for the system are wholesale distribution and manufacturing, Fera said.

Univac has set up offices in 18 major U.S. metropolitan areas. Marketing will at first concentrate on first-time users and accounting machine users who need added capacities.

According to the company's market research, wholesale distribution has about 185,000 prospects and the manufacturing market base more than 125,000 prospects. More than 75% of these prospects are located within the target marketing areas.

A test system has been out in the field since May 1975, Fera noted, with a total of six test sites operational. Initial customer delivery of the system will not be until April, however, he added.

"Only 20% of the market we are looking at has installed a small business system," J. A. Bertch, director of business systems marketing, pointed out.

Customer support and a full complement of application-oriented programs that can be tailored by the user are the key to the BC/7, the Univac executives agreed.

To aid in customer support, the firm is

equipping all branch offices with the system. Training will take place in either the branch offices or at the user's site, Fera explained, and an entire set of documentation and tapes has been prepared for this purpose.

Applications can be up and a staff trained in days, he claimed.

Marketing will begin with local newspaper ads, followed by national advertising, Probst said. Univac will be using local radio advertising to reach the businessperson with \$1.5 million to \$15 million in annual sales on his way to work.

Univac is evaluating whether to expand the product into the contractor trades, hotel and motels, labor unions and professional services, Bertch stated.

The system is being manufactured in Salt Lake City.

Racal vs. Adds

NEW YORK — Racal Electronics Ltd. has extended until Feb. 3 its offer of \$30 per share in cash for all stock of Milgo Electric Corp.

The extension is in compliance with an order issued by the U.S. District Court for the Southern District of New York upon the motion of Applied Digital Data Systems, Inc. (Adds) to allow Milgo stockholders time to consider a revised offer from Adds.

Adds, meanwhile, has increased its bid for Milgo to over \$55 million in stock.

Following stockholder approval last week, Adds will offer to exchange \$2.50 in cash and one share of preferred stock for each share of Milgo common. The new Adds preferred stock is convertible into 2.25 shares of common instead of two shares, as in the previous offer [CW, Jan. 31].

Vendors, Agencies in TSP Limbo

(Continued from Page 40)

increased the average price of its service, Miller stated.

Another "vendor hardspot" has to do with the GSA's refusal to permit vendors to negotiate exceptions to the price reduction clause. That clause stipulates that vendors can't lower commercial prices below what they offer to the government.

In effect, those firms providing the government with the biggest discounts are the ones who suffer the greatest penalty.

The result has been that vendors get on the schedule at a higher price than they would have if this clause had been negotiable, Miller explained. The government pays a higher price than might have been necessary — and pays with taxpayer dollars.

Under TSP as currently written, it isn't clear when agencies will be able to use the "basic agreement" arrangement which opens up selection of service to the entire market of teleprocessing firms, in lieu of choosing their service from firms on the schedule.

Vendors who have guaranteed discounts in order to get on the schedule therefore aren't guaranteed business with the agencies, Miller said.

Miller believes the basic agreement should be used only in those cases where an agency's needs exceed the maximum order limitations placed on services acquired from the schedule or where no firm on the schedule can satisfy the agency's service demands.

Base to Hit \$70 Billion in '81

(Continued from Page 40)

the depressed level of \$6.4 billion in 1975.

Returned equipment had about the same value for both years, \$1.8 billion, indicating the wave of returns in the early '70s has ended, according to ADL. The net addition to the installed base in 1976 was \$5.9 billion, 28% greater than in 1975.

Shipments outside the U.S. were also strong in 1976, according to ADL. The year-end gross value for all manufacturers was estimated at \$7.2 billion, up 30% from 1975.

For U.S. manufacturers, the estimate for 1976 was \$5.4 billion, up 26%. The U.S. share of foreign shipments decreased from 78% in 1975 to 75% in 1976, and the value of returned equipment to U.S. vendors rose from \$9 billion to \$1.4 billion, according to the report. Nevertheless, the installed

overseas base of U.S. equipment abroad showed a 19% increase in 1976.

In the next five years, the U.S. manufacturers' combined share of the overseas installed base should continue to decline slowly, to 67% in 1981, it said.

The strongest competition for the U.S. computer industry will come from Japan.

According to Rothenbuecher, Japan is making "impressive strides toward an integrated, export-oriented industry."

However, "whether the Japanese computer industry can become fully competitive with the U.S. manufacturers depends on its ability to shortcut the latter's long evolutionary lead time in critically important systems programs," he said.

Siemens and International Computers Ltd., the main European competitors, face the same problem, he noted.

ENTREX, INC.

- Data Entry Systems
- Small Business Systems
- Distributed Data Processing Systems



ENTREX, INC., is a privately held company serving the Distributed Data Processing Market.

- 30,000 terminals and over 2,500 systems worldwide provide sophisticated data capture and processing at the source of the transaction or event.
- Complimentary literature on ENTREX, INC., and its product lines is available on request, c/o Marketing Services Department.

ENTREX

168 Middlesex Turnpike, Burlington, Massachusetts 01803

*These securities have been placed privately with institutional investors.
This advertisement appears as a matter of record only.*

\$5,880,000

Entrex, Inc.

**\$4,700,000 Convertible Subordinated
Debentures due July 1, 1984.**

**\$1,180,000 First Series Convertible
Preferred Stock**



PaineWebber

January 28, 1977

HEWLETT  PACKARD

Just one of the many leading companies you'll see at

**COMPUTER
EXPO 77**

SEE HEWLETT-PACKARD'S FAMILY OF COMPUTER SYSTEMS INCLUDING THE 2640 SERIES DISPLAY TERMINALS, HP 1000 COMPUTER SYSTEMS WITH THE NEW 21 MX E-SERIES PROCESSOR, AND STATE-OF-THE-ART APL AVAILABLE ON THE LOW-COST, SOPHISTICATED HP 3000 SERIES II COMPUTER SYSTEM.

Organized by:

**COMPUTER
CARAVAN
77**

The national computer exposition that's coming to you.
797 Washington Street, Newton, MA 02160
(617) 965-5300.

San Francisco • Los Angeles • Cleveland • Minneapolis/St. Paul
Chicago • New York • Philadelphia • Washington, D.C. • Boston. Starts March 29th.

Includes DP, Communications

Siemens Gets Order for German Net

Special to Computerworld
MUNICH, W. Germany — The German Federal Railways and Siemens AG have signed a contract for computer systems worth about \$46 million, thus taking the first step toward integrated transport control.

The technical and regional combination of modern railroad operating methods with data and communication systems is expected to add a new dimension to the application of DP systems.

The core of the integrated transport control system will be a supranational interconnected data network to control freight and passenger train traffic all over the Federal Republic of Germany. This will be made possible by a full-scale linkup of data and communication systems with the operational procedures in the entire network of the German Federal Railways.

Information on the working condition of the rolling stock, comprising 375,000 railroad cars and 8,000 locomotives, and on the train personnel must be stored in the system, updated regularly and activated for control of the service.

Previously, point-to-point connection of DP facilities was the chief concern, even where complex interconnected systems were involved. The integrated transport control system, on the other hand,

International News

will collect, process and activate operational data both for the entire route network of the railway and for its associated organizational levels.

About 100 Siemens Transdata 960 communications computers, forming a radial data communication network, will switch and control the flow of information between terminals in railroad stations, goods forwarding departments and technical departments as well as between 20 Siemens 7.740, 7.750 and 7.755 DP systems.

Rapid Growth of DP Use in Israel Highlighted at Conference, Show

By Alex Ragen

Special to Computerworld

HAIFA, Israel — More than 2,000 DP professionals from Israel and abroad gathered here recently to attend the Israel Information Processing Association's 11th annual congress.

The keynote speaker at the opening ceremony was Prof. Michael Rabin, chairman of the mathematics department at Jerusalem's Hebrew University and this year's recipient of the Turing Award.

Rabin noted the rapid development of computer usage in Israel in the last decade — in 1976 there were more than 500 computers outside the defense establishment compared with 48 in 1965.

In this field, Israel is either the most advanced of the developing nations or the least advanced of the developed nations, depending on one's point of view, he said.

With which group Israel's future lies depends on her industry; as a small country with almost no natural resources, Israel can hope to compete in the international marketplace only if its industry maintains the highest standards and uses the most sophisticated modern technologies, he stated.

The obstacles to achieving these goals, in Rabin's view, are mainly educational — training the vast number of scientists and technicians needed, finding suitable employment in Israel and overcoming the Israeli student's chronic aversion to learning English, which he called "the window to the world."

Equipment Exhibit

On the exhibit floor, IBM showed its 5100 desk-top computer, and Wang was there too with its desk-top system.

The processing and data communications system will consist of three levels: a concentrator level for communications with the data terminals, a regional computer level and a main computer level.

The regional level is divided into nine computer centers based on large Federal Railways regions. By means of a continuous flow of communications, all information — from individual consignments to pallets and containers to car loads and complete train formations — will be collected.

In addition, the routing of the trains will be shown in the information system of the regional computer and used for operational control.

The main computer level will handle the interregional information flow and control train traffic that crosses the national borders.

This large-scale project will be realized in stages. In the first stage, which is to be completed in four years, the integrated transport control system will provide for centralized calculation and accounting for freight traffic, a vehicle information and announcement system for freight cars, passenger coaches and tractive units and train running control.

Two Israeli firms, Elbit and Elta, showed their IBM plug-compatible CRT terminals.

In general, however, the hardware fair was less impressive than last year's, primarily because the exhibition area was small and fewer companies were there.

Mimi '77 Set for Zurich in June

ZURICH, Switzerland — Mimi '77, sponsored by the International Society for Mini- and Microcomputers, will be held at the Kongresshaus here June 7-9.

The exhibition will cover minicomputers, microcomputers, microprocessors, storage devices and software as well as educational aids and microelectronic components.

In addition, a symposium will cover all aspects of the systems and their applications. Topics will include computer networks, distributed processing, manufacturing, selection procedures and technology.

Further information on the conference and exhibit is available from Mimi '77, P.O. Box 354, 8053 Zurich, Switzerland.

System/3 — Models 4 and 6

PRINTBOUND?

Upgrading to satisfy increased print requirements?

DON'T!

Our DAC/3 - 400 - 550-750LPM printers can be interfaced to your system/3 to expand its capability.

Call or write today!



Digital Associates Corporation

1039 E. Main Street, Stamford, Ct., 06902 (203)327-9210
Printers for ALL Models of System/3.

YPFB the Bolivian state owned oil company invites all interested companies to submit documentation for qualification for EDP consultancy. Those companies that meet the qualifications criteria will be invited to present bids for the company, EDP project to be carried out in Bolivia. The project involves:

- The implementation of a materials control system where the programs have already been developed.
- The computerization of the company administrative system.
- The application of EDP in the day to day oil field operations such as production, drilling, reservoir engineering (excluding simulation), refining, marketing.
- Streamlining of the flow of information between H.W.Q., division offices and field.

Documentation portfolios will be accepted until 1800 hrs. (CST) of Tuesday the 1st of March 1977 at the following address:

Y.P.F.B.

3334 Richmond Ave. Suite 105
Houston, Texas 77098

Attn: Gloria Alvarado

The company currently owns two medium size IBM 370/115 systems and is in the process of expanding them.

A minimum of one person assigned for a period of one-two years will be required.

CASH
3420 tape
drives
COMDISCO
9701 W. HIGGINS RD.
ROSEMONT, ILL. 60018
(312) 698-3000

FIELD SERVICE
MANAGEMENT
SEMINARS
FOR MIDDLE & SENIOR
MANAGERS

Los Angeles	Dallas
March 23-25	April 6-8
Philadelphia	Boston
April 20-22	May 4-6
Minneapolis	San Francisco
May 18-20	June 1-3

WRITE FOR BROCHURE

BUSINESS KNOWLEDGE
20501 Hatteras Street
Woodland Hills, CA 91367

Save Big
on 2-Year
Leases!

IBM

3420 & 3330

By utilizing your rental credits, CFI will purchase and lease back your installed disks, tapes and printers for short terms.

SAVE 15% to 20%

Call Mike Balon at
(201) 489-2600

COMPUTER
FINDERS, INC.

One University Plaza
Hackensack, N.J. 07601

WE HAVE IBM
SERIES/1
FOR DELIVERY NOW!

**SHORT-TERM
LEASES**

**BOSTON COMPUTER LEASING
CORPORATION**

P.O. Box 68, Kenmore Station
Boston, Massachusetts 02215 **617-261-1100**

Sign up now for the Computer User event of the year!

Case Studies in Data Processing

the special Computer User Forums held in 9 cities—in conjunction with

COMPUTER EXPO 77



Register now to participate in a city near you — and also attend free the largest multi-city computer show of the year!

Each of the Computer User Forums will be conducted by a leading user or independent consultant who will lead seminars and workshops on these relevant, up-to-date topics.

Tuesday: Case Studies in Applying Minicomputers — the Mini as Mainframe; Distributed Minis (with and without) Data Communications; Organizational Impact of a Distributed Mini System.

Wednesday: Case Studies in Managing Terminal Networks — "Dumb" Terminal Networks, "Intelligent" Terminal Networks; Remote Batch Systems; Communications Control Equipment.

Thursday: Case Studies in Improving Software Productivity — Personnel Recruiting, Selection and Training; Software Alternatives; Measuring Systems Utilization; Documentation and Maintenance Aids.

All Forums will take place from 9 AM to 1 PM.

Concurrently, hundreds of exhibitor products and services will be shown at Computer EXPO 77 each day from 10 AM to 5 PM. There is no admission charge to the exhibit hall.

See the latest and the best in:

Data Communications Terminals, Minicomputers, Software, Printers, Data Input Equipment, CRT Terminals, Computer Output Equipment, Data Communications Interconnect Equipment, Supplies, Magnetic Media, Modems, DP Education, Small Business Computer Systems, Miniperipherals, Flexible Disk Drives, Magnetic Tape Transports, Cassette Systems, Microcomputers, Keyboards . . . and more!

HOW TO REGISTER FOR THE FORUMS

(No advance registration or admission charge is required of qualified executives for the Computer EXPO program — including exhibit hall and exhibitor seminars. Your business card will admit you.)

Send to:
Registration Office
Computer EXPO 77
797 Washington Street
Newton, MA 02160
(617) 965-5800

Register me for ☐ all three days
☐ Tuesday
☐ Wednesday
☐ Thursday

Name _____ Title _____
Company _____
Street and Number _____ City _____
State _____ Zip _____ Telephone () _____

Check city in which you plan to attend:
(your acknowledgement form will include complete details on times and locations)

- | | |
|---|--|
| <input type="checkbox"/> San Francisco | March 29-31, San Francisco Civic Auditorium |
| <input type="checkbox"/> Los Angeles | April 5-7, Los Angeles Convention Center |
| <input type="checkbox"/> Cleveland | April 19-21, Cleveland Convention Center |
| <input type="checkbox"/> Minneapolis/St. Paul | April 26-28, St. Paul Civic Center |
| <input type="checkbox"/> Chicago | May 3-5, McCormick Place |
| <input type="checkbox"/> New York | May 10-12, New York Coliseum |
| <input type="checkbox"/> Philadelphia | May 24-26, Philadelphia Convention Center |
| <input type="checkbox"/> Washington, DC | May 31-June 2, Sheraton Park Hotel |
| <input type="checkbox"/> Boston | June 7-9, Northeast Trade Center (Rte. 128, exit 39) |

(Registration for any single forum day entitles you to attend all three days of exhibits. If you wish to attend the exhibits only, no advance registration is required.)

☐ Check Enclosed ☐ Purchase Order Enclosed ☐ Charge my American Express

Cardholder Number

Expiration Date _____

Cardholder Signature _____

PAYMENT RECEIVED

☐ \$45.00 One Forum Day ☐ \$80.00 Two Forum Days ☐ \$115.00 Three Forum Days

Please Circle 1 Number in Each Category

BUSINESS/INDUSTRY

- 10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail/Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government — Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other _____

TITLE/OCCUPATION/FUNCTION

- 11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg. Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other _____

COMPUTER CARAVAN 77

A division of Computerworld, Inc.
797 Washington Street, Newton, MA 02160

Do it now.

POSITION ANNOUNCE- MENTS

PROGRAMMER/ANALYST

Join a small, efficient, adventurous, research team. Current and planned projects involve Interactive Graphics, Information Retrieval, Natural Language Processing, Heuristic Programming, Microprocessors, Laboratory Data Acquisition, and Financial Simulation.

Our PDP 11/45, under RSX, is dedicated to Online Programming using modern structured design and analysis techniques.

If you feel that you could make a significant contribution to our group, please write, describing your background and experience as well as your salary requirements to:

CW Box 4894
797 Washington St.
Newton, Mass. 02160
an equal opportunity employer

SENIOR ANALYSTS SYSTEMS AND PROJECT MANAGERS

The growth of our Retail Systems Division has created immediate openings for career-oriented EDP professionals. Positions for senior analysts and systems managers are available in GEORGIA, ALABAMA, and TENNESSEE.

Qualified candidates will have at least two years experience in large scale systems with on-line application design and development. College degree required. Project management responsibility a definite plus. In addition to competitive starting salaries, we offer a benefit program that includes: relocation package; noncontributory health care, life insurance, and retirement plans; tuition aid; vacation, and 12 paid holidays.

IT'S YOUR FUTURE... If you have a proven record of self-initiative, imagination and results, why not explore these exciting opportunities now and see what the WORLD of NCR may hold for your career.

Respond now in confidence — include salary history.

NCR

NCR Corporation
Regional Retail Director
P.O. Box 704
Norcross, Georgia 30091
Equal Opportunity Employer

Coordinator of Academic Computing Services Coordinates and promotes use of computers, CAI, statistical and other educational software. Half-time teaching appointment with an academic department. Requires Masters degree in computer science, statistics or education with emphasis in CAI and experience with CAI systems. Available June 1, 1977.

Systems Analysts and Programmer For the IBM 360 model under the DOS operating system. System analysis of business and accounting functions within the university. Requires knowledge of IBM 360 DOS, assembler, COBOL and automated accounting systems. Two years college in computer science or accounting required. Two years experience preferred. Available immediately. Application deadline: 2/21/77.

Apply to Personnel Manager.

Northwest Missouri State Univ.
Maryville, Missouri 64468
Equal Opportunity Employer

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

position announcements

CUSTOMER SERVICE COORDINATOR

for Dartmouth Time-Sharing System Software. Help customers use DTSS software. Manage customer service desk. Organize database of customer requirements and solutions. Dig into internals of sophisticated time-sharing operating system software. Respond to demanding customers in dynamic environment of million dollar software company with growing sales, service, and product development activities.

Applicant must be familiar with computer software business or with time-sharing computer service business. Must know several high-level and one low-level computer programming language well. Must have good self-organizational skills, ability to write reports. Must be self-confident and polite, used to dealing with people firmly and helpfully. Must have good general problem-solving skills and motivation to follow tasks through to completion. Desire college graduate; experience with DTSS software a plus.

DTSS Incorporated, owned by Dartmouth College, is a four-year old company selling licenses to use the Dartmouth Time-Sharing System Software. Please send letter and resume to DTSS Incorporated, Box 799, Hanover, NH 03755. An Equal Opportunity Employer M/F.

position announcements

EDP AUDITOR

Blue Cross and Blue Shield of North Carolina, a major health insurance firm, seeks candidates to fill the Plan's EDP Auditor position. Primary responsibility is the ongoing review of EDP activity to evaluate and report on the adequacy of internal controls in existing systems and all proposed new systems. Work environment includes IBM equipment, on-line and off-line applications, and data base files.

Qualified candidate will possess a college degree, preferably in data processing, and a minimum of five years experience in system analysis or programming. COBOL is a must. At least one year's experience as an EDP Auditor is required. Send resume establishing qualifications, employment and earnings history, and salary requirements to:

Personnel Manager
BLUE CROSS/BLUE SHIELD
OF NORTH CAROLINA
Post Office Box 2291
Durham, N.C. 27702
An Equal Opportunity
Employer M/F

position announcements

ELMIRA COLLEGE Elmira, New York 14901

Elmira College, an independent, coeducational, non-sectarian, liberal arts college in the Finger Lakes Region of Upstate New York announces an opening for September, 1977 for a person with teaching ability and academic expertise in the field of

Quantitative Management Science/Computers

We are seeking a specialist to develop and teach undergraduate courses in the areas of production management, decision theory, systems analysis and M.I.S.; to take leadership in developing and managing a comprehensive computer major for the business department; and to provide academic and career guidance to students. We require the Master's degree and prefer persons with business experience. Rank and salary are open depending upon background and experience.

Elmira College places the student at the center of the educational enterprise. We seek as faculty persons who possess a breadth of education and experience, as well as expertise in special areas of knowledge and the ability to assist students in their effort to learn. Elmira College has a full-time day enrollment of 950 students, 45 per cent of whom are men, and a part-time continuing education enrollment of 2700, approximately 1000 of whom are graduate students. We offer Associate degrees in eight fields, Baccalaureate degrees in forty-nine fields, and the Master of Science in Education.

Interested candidates should forward a resume or full credentials to:

Mr. Gale E. Rand
Department of Business Administration
Elmira College
Elmira, New York 14901

ELMIRA COLLEGE IS AN EQUAL OPPORTUNITY EMPLOYER

DATA PROCESSING ENTREPRENEUR

We are seeking an individual in each metropolitan area to participate in a new publishing venture serving the Data Processing profession. Prospects must be of good reputation with experience in providing data processing, related goods or services. This opportunity, which may be pursued in conjunction with other activities, offers high profit potential for minimal financial exposure.

For additional information write:

D&M PUBLICATIONS, INC.
Oakwood Tower, Suite 816, 3626 North Hall
Dallas, Texas 75219

PROGRAMMER/ANALYST

IBM 370/155 Installation

Teleprocessing Systems of 325 Remote Terminal
Operating under DOS/VS
(Installing Programmer Time Sharing)

We are offering an excellent position in our Information Systems Division to an individual with:

- 3-4 years application programming experience in ASSEMBLER LANGUAGE
- Some knowledge of COBOL is preferred, but training will be provided if necessary.
- Programming experience in CICS, FTS or other on-line or real-time environments a definite plus.

If you are looking for an excellent future, based on individual performance, attractive starting salary, and benefits program, please send resume and salary history, in strict confidence to:

ARISTAR MANAGEMENT

Personnel Administration
P.O. Box 343781, Miami, Fla. 33134
(305) 442-6715

Programmers-IMS Analysts-IMS We have what you want.

Informatics is now staffing for a new IMS DB/DC Order Entry/Inventory Control development project in Southern California. TSO will be used and you will learn and employ structured design and programming techniques.

We offer qualified applicants a full-time permanent position at competitive salary, significant job responsibility, superior benefit package and a genuine professional environment in which to grow.

If you are a talented professional programmer or analyst with a working knowledge of IMS and at least 2 years of experience using COBOL under OS, please send your resume with current salary to:

Informatics PMI

500 E. Carson Plaza Dr.
Carson, California 90746

An equal opportunity employer

MINICOMPUTER MAINTENANCE ENGINEERS

Field Service Engineers with at least 3 years experience maintaining DEC PDP-11 Family of Minicomputer CPO's and their peripherals. Should be a technical school graduate or have equivalent experience and training. Requires comprehensive knowledge of complex data acquisition systems, communications systems, etc. using PDP-11/40's, 11/45's, 11/34's, etc.

Candidates must have demonstrated ability to write simple machine language test routines, understand thoroughly internal structure and interflow of data within processors, and be knowledgeable in use of MAINDEC and DEC-X diagnostics. Familiarity with non-DEC peripherals is an asset.

The University of California's Los Alamos Scientific Laboratory offers excellent working conditions and fringe benefits. Located high in the mountains of Northern New Mexico, the living is uncrowded and casual; the environment is pollution-free; the climate is superb — cool summers and mild winters; and recreational opportunities abound.

Send resume and salary requirements in confidence to:



**los
alamos**
SCIENTIFIC LABORATORY
OF THE UNIVERSITY OF CALIFORNIA

R. Lynn Wilson, Recruiting Director
Division - 77-M
Los Alamos Scientific
Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

An Affirmative Action/Equal Opportunity Employer U.S. Citizenship Required

Programmers

Systems Programmers San Francisco Peninsula

Are you familiar with large scale IBM systems (360/370)? Then join Lockheed now. We're looking for individuals experienced at assembly language level with knowledge in any one of the following systems software areas: Operating Systems; Data Base Management; Communications; Teleprocessing; Timesharing Systems and associated languages; utilities and Space Management.

Responsibilities include installation and maintenance of IBM systems software and development, installation, maintenance and documentation of in-house systems software. College degree in Computer Science preferred, one year of work or practical college experience on large scale IBM systems.

Take charge of your career path now and join a truly dynamic and diversified company. For immediate consideration, please forward your resume with salary history to Professional Employment, Dept. S-3, P.O. Box 504, Sunnyvale, California 94088. We are an equal opportunity affirmative action employer.

LOCKHEED
MISSILES & SPACE COMPANY

position announcements

position announcements

position announcements

position announcements

position announcements

FIELD ENGINEERS

Los Angeles
Houston
Knoxville
Atlanta

Boston
Rochester
San Francisco
Albany

SORBUS INC., the country's leading independent computer and business equipment maintenance company, has immediate employment opportunities in the above cities, and others, for Field Engineers with experience and training on any of the following equipment: **IBM 360 & related, Mini's & peripherals, and terminals.**

These positions provide excellent compensation, challenge, and an environment conducive to personal and professional growth. If you're interested in working for a progressive company with an excellent growth record and a bright



SORBUS INC.
an M/A company

future, call toll-free 800-523-5632, or send your resume to: Bill Patch, Personnel Director, SORBUS INC., 150 Allendale Road, King of Prussia, PA 19406. An Affirmative Action Employer.

DATA PROCESSING SALESPERSON

Data processing service bureau in Newport Beach, Southern California.

Must be experienced. Excellent opportunity. Submit resume with salary history to President.

HDC Corporation
1801 Dove
Newport Beach, CA 92660

Medical Center
Director of Data Processing

Our client, a prestigious South-eastern University Medical Center, seeks a capable, experienced, highly motivated individual to direct its data processing activities. A minimum of five years experience in data processing with significant experience in a supervisory capacity is required. Experience in the health care field and master's degree are a plus. The successful candidate will be an energetic self-starter who is seeking a challenging and rewarding career. All responses will be held in strictest confidence. Send resume and salary history to:

CW Box 4887
797 Washington St.
Newton, Mass. 02160

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES

Employment Agency for Computer Professionals

Manager
Systems Development

Make Your Future with the Leader

Datapoint Corporation, the leader in dispersed data processing and one of the fastest growing companies in the computer industry and data processing field, provides an outstanding opportunity for a manager of systems development at its corporate headquarters in San Antonio.

We are seeking a bright, aggressive individual who has demonstrated his ability to implement data processing systems and has a strong background in order entry, billing, sales analysis and financial applications. Individuals with a minimum of 5 to 6 years successful experience in project and people management are encouraged to send their resume and salary history in confidence to **Mr. Don Warrington, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

An Affirmative Action Employer Committed to Equal Opportunity

DATAPoint CORPORATION



The leader in dispersed data processing™

SYSTEMS
PROGRAMMER

Burger King Corporation has a career opportunity for a Systems Programmer at their Miami headquarters. 2-3 years IBM/370 experience in OS/VS, VSAM and data communication utilizing CICS, will qualify you for an exciting position in our growing Information Systems Department. Send resume and salary history to:

BURGER KING
CORPORATION

PO Box 520783
MS 190 Miami, Florida 33152
Equal Opportunity Employer M/F

ACADEMIC SYSTEMS
COORDINATOR

Applications are invited for the position of Academic Systems Coordinator in the Division of Academic Systems. This Division of the Office of Educational Systems has responsibility for coordinating academic computing in the Oregon State System of Higher Education. Candidates should have significant experience in academic user services (or equivalent). Liberal fringe benefits, salary commensurate with experience (minimum of \$17,000/year). Position description will be sent to all applicants.

All nominations and applications must be postmarked no later than February 2, 1977; must be received no later than March 7, 1977; and must be sent to:

Mads Ledet
Office of Educational Systems
Oregon State System of
Higher Education
Post Office Box 3175
Eugene, Oregon 97403

An Equal Opportunity Employer

DALLAS AREA
FEE PAID

Systems Programmer	18-22K
Senior Programmer	To 21.3K
Systems Analyst	To 20.1K
Software Analyst	17-20K
Programmer	15-18K
Programmer/Analyst	14-16K
Senior Operator	To 12K

All positions require IBM 360/370 OS experience, IMS data base with CICS knowledge. Call or write today.

D.P. PEOPLE, INC.

Personnel Agency
(214) 231-1984
P.O. Box 31481
Dallas, Tx 75231

PROGRAMMER
SENIOR SYSTEMS ANALYST

Opportunity for individual with minimum 3 years RPG 2 on Systems 3 MOD 10, at this major midtown New York City jewelry manufacturer.

Position offers attractive starting salary, and PROFESSIONAL environment.

Please forward resume or call:
PERSONNEL (212) 575-9300

FEATURE RING CO.
130 W. 46th St., N.Y.C.

An Equal Opportunity Employer M/F

SYSTEMS
PROGRAMMER

Fortune 500 Corporation has a position available for an experienced Systems Programmer. We seek a highly motivated and experienced individual for systems generating planning and execution, monitoring shop and systems performance, and installation of software packages. Responsible for software development and maintenance of projects on DOS/VS power, CICS, VTAM.

Candidates should have thorough knowledge of systems programming functions as it applies to a DOS/VS shop. BAL required. Conversion experience from DOS/VS to an OS/VS system desirable.

We can offer an exceptional salary and fringe benefits, an excellent work environment, and a challenging position and future growth with our company. If interested, send resume in confidence, or call:

CF INDUSTRIES

Salem Lake Drive
Long Grove, IL 60047
(312) 438-9500 Ext. 212
An Equal Opportunity Employer

CF Industries, Inc.

Bell-Northern
ResearchVM/370
Systems
Programmer

Bell-Northern Research has an immediate opening in Ottawa for a systems programmer in the System Software Support Group to maintain and enhance our IBM 370/168 VM/CMS system.

The successful applicant will have a minimum of 2 years systems experience with VM/370 or CP-67 and have specific expertise in one or more of the following areas:

- TP programming techniques
- DASD and TAPE I/O at SIO level
- VSAM under CMS
- performance measurement and evaluation
- scheduling and dispatching

Candidates should preferably hold a bachelor degree, however a Master's degree in Computer Science would be a definite asset.

This position offers excellent growth opportunities, a competitive salary commensurate with experience and abilities, and excellent company paid benefits.

Relocation assistance to Ottawa will be provided.

Please send a detailed resume, in strict confidence, quoting file number (11/77) to:

Mr. Ron G. MacMeekin
Staffing Specialist
Bell-Northern Research Ltd.
P.O. Box 3511, Station C
Ottawa, Ontario
K1Y 4H7

Computer
Professionals:

YOU'RE THE
BOSS
AT NCA.



National Computer Associates

CHICAGO
McCormick & Associates, Inc.
386 North York Street
Evanston, Illinois 60126

DALLAS
Data Processing Careers, Inc.
Suite 1199
Stammons Tower West
Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
1795 Fisher Building
Detroit, Michigan 48202

FLORIDA
Data Sciences Personnel, Inc.
Suite 265, 15400 N.W. 7th Ave.
Miami, Florida 33188

HARTFORD
Campus, Inc.
800 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd.
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
601 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

NEW YORK
Data Associates, Inc.
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
TaskForce, Inc.
1046 E. Wendover Ave.
P.O. Box 6880
Greensboro, N. Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa. 19086

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15210

Computer Personnel Firms interested in NCA Membership, write to: J. McNamara, 2990 W. Grand Blvd., Detroit, Mich. 48202

SAN FRANCISCO
The Computer Resources Group
Agency, Inc.
303 Sacramento Street
San Francisco, California 94111

SYRACUSE
CFA Associates Personnel, Inc.
(Agency)
2530 James Street
Syracuse, New York 13206

TULSA
Data Processing Careers, Inc.
Suite 10, Park 21 Building
2626 East 21st Street
Tulsa, Oklahoma 74114

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue N.W.
Washington, D.C. 20036

In advancing your career there are several personnel firms to choose from. Perhaps you find it difficult to decide which one.

This may help. Unlike some other networks, we are not a group of branch offices accountable to some mighty mogul for meeting monthly sales quotas. Each of our NCA offices is privately owned by those who operate them. Thus, we are accountable only to you and to the employers of computer professionals. So, you are indeed the boss at our offices. Our success depends entirely on serving you to your complete satisfaction. That is respect. That is professionalism.

Try us. You'll see what a difference it makes when you're the boss. Contact the NCA office in your area. No charge to you because employers pay our fees.

position announcements

position announcements

position announcements

position announcements

position announcements

WANG Needs Professionals

TO JOIN THE PROFESSIONALS WHO ARE MAKING OUR COMPANY A LEADER IN THE COMPUTER AND WORD PROCESSING INDUSTRIES.

Software Senior Diagnostic Programmer

Responsibilities will include interfacing with R & D and Manufacturing to develop diagnostic routines for microprocessor and I/O peripherals including CRT terminals, printers, plotters and disk drives. Candidate should have 2 or more years related experience. Computer Science or EE degree desirable.

Systems Programmers

Unique opportunity to work on virtual memory operating systems. Understanding of control program concepts, Assembler and several high level languages required. Must work well independently and as a member of a design team.

Programmers

#R 52-022

Quality Control — Software

We are looking for people with a knowledge of software quality assurance. Responsibilities will include review of project function and program design specifications in preparation for defining and developing test procedures to assure reliability of software and consistency with user documentation. Applicants should have minimum 2 years programming experience, preferably CRT based mini-computers with BASIC language support. Bachelor's degree required.

Research and Development Diagnostic Engineer/Programmer

We have an outstanding opening for an individual who is experienced in using software to both verify hardware design and diagnose problems. This person should have at least 3 years of related experience and should be familiar with hardware design as well as machine language programming.

We offer attractive starting salaries and excellent fringe benefits. We are an affirmative action/equal opportunity employer. Please send your resume including academic background and salary history and requirements in confidence to

PROFESSIONAL EMPLOYMENT

WANG

LABORATORIES, INC.

One Industrial Avenue, Lowell, Massachusetts 01852

KAISER STEEL

Has Openings at its Fontana, California Plant for:

- Sr. Systems Analysts & Systems Analysts--Manufacturing
- Systems Programmers
- Systems Analysts & Programmers--Process Control

Send resume, in confidence, to Personnel Dept.

KAISER STEEL CORP.

P.O. Box 217, Fontana, CA 92335

An Equal Opportunity Employer M/F

YOUR COMPUTER CAN'T FIND THE JOB FOR YOU. OURS CAN.

National Personnel Associates®

175 Professional Firms in 130 Metro Areas

D. BROWN & ASSOC.
Data Processing Division
610 S.W. Alder, Suite 711
Portland, Oregon 97205
(503) 224-6860

AVAILABILITY, INC.
Data Services Consultants
1300 N. Westshore Blvd.
Tampa, Florida 33607
(813) 872-2631

JIM KING & ASSOC.
EDP Division
438 Gulf Life Tower
Jacksonville, Fla. 32207
(904) 398-7371

Specialists in the placement of EDP Professionals.

SYSTEMS ANALYST/CUSTOMER SERVICE

Philadelphia

Well established, growth-oriented, manufacturing company seeks person with 5 years of general business knowledge with experience in COBOL to work in sales environment. Local travel. Degree preferred. Excellent salary and benefits plus company car. Submit resume or contact SANDY BROSSMAN,

BROSSMAN-BURNS

EMPLOYMENT SPECIALISTS
ALL FEES PAID 337-0252

MANAGER PROGRAMMER

Opportunity to join a bank that believes Data Processing is important. This \$90 million bank located 60 miles south of Chicago processes for several banks using NCR CIF and FOCIS.

All applicants must have at least two (2) years CIF experience and know Neat III level II. Familiarity with FOCIS Software and COBOL helpful. Salary commensurate with experience.

CITY NATIONAL BANK

Box 428 189 E. Court St.
Kankakee, IL 60901
(815) 937-3613

TONE Software Corp.

One of the Nation's fastest growing software development companies has immediate openings for:

Systems Engineers

Applicants must be knowledgeable of VS-1 internals and be willing to multiplex development and support with sales.

Liberal benefits - Salary to 30K

TONE Software Corp.
11588 Trask Ave.
Garden Grove, Calif. 92643
(714) 636-8501

SYSTEMS ENGINEERS

Client company seeking experienced COBOL or ALC programmers to participate in advanced development and systems installation.

If you have experience in one or more of the following:

- Life Insurance Daily Cycle
- Agency or Accounting systems
- Actuarial Applications
- Pensions
- Investments/Financial
- Claims
- CFO, LIFE/70, LIFE-COMM, ALIS

I'd like to talk with you. Minimum requirement is two years of active programming. Salary to \$24,000. Take advantage of your experience and call or write to explore this career opportunity. Quality people are My Business.

RANDOLPH (JACK) EDWARDS
F.L.M.I.

DATA PROCESSING CAREERS,

7715 Chevy Chase Dr., Suite 125
Austin, Texas 78752
(512) 452-0971

Nationwide Personnel Consultant

Software Engineer

We are seeking an individual to assist in the design and implementation of approved upgrades to system software and utilities for DEC systems 1090 (TOPS-10) and PDP-11/45 (RSTS); helps develop software engineering tools. Provides general user support through superior documentation.

Requires a BSCS and experience as a programmer and/or software engineer.

Tektronix, Inc., develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon, we are within a two hour drive of the Cascade Mountains or Ocean Beaches. The close-by nature playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send resumes to: Mary Walhood, TEKTRONIX, INC., P.O. Box 500, C33, Beaverton, OR 97077.

An Equal Opportunity Employer M/F



TEKTRONIX®
committed to technical excellence

PROGRAMMERS/ANALYSTS

NCR's CRITERION COMPUTER SYSTEM has created immediate openings at NCR San Diego

- Supervise system integration planning and execution for a large virtual storage system. Define and implement integration processing for a Multiprocessing Multiprogramming system.
- Design, develop and implement software test systems, programs and software testing tools. Accomplish integration testing at the system level.
- Support and enhance a series of compilers and Operating System peripheral software. Software support includes problem resolution, update, testing and release of software files and documentation for on-going support.
- Responsible for business application programming and basic systems analysis. Requires two to three years Cobol programming experience, preferably in manufacturing environment. Data base and on-line experience desirable. College degree or equivalent experience.
- Perform computer system measurement and system simulation using GPSS or SIMSCRIPT. Requires 3 years experience in computer measurement and/or system simulation plus Management Science or Computer Science Degree.

(Firmware)

- Design and develop state-of-the-art firmware packages for a new computer line. Candidates should be knowledgeable in computer architecture, firmware development, high level language implementations using firmware, and operating system principles. Programming experience should emphasize assembly language or microprogramming.

(Test Systems)

- Position requires individual capable of performing computerized test system software development, digital logic, simulator development, and system diagnostic programming. BSEE or Computer Science degree and previous related experience required.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents. Full relocation expense allowance.

Please submit resume including salary history and experience or apply in person to: Professional Placement Office.

NCR

Data Processing Division
16575 W. Bernardo Drive
San Diego, California 92127

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

UNIQUE OPPORTUNITY

BOSTON AREA

TECHNICAL PROGRAMMERS

3 or more years experience

Increase your income substantially and take advantage of the new pension laws. Enjoy the benefits of free lance programming without the risk. Challenging technical assignment.

Requirements: ■ Fortran or Assembler Language
■ Scientific, Engineering or Diagnostic Applications
■ Real-Time and Aerospace/Military Experience Preferred

Send resume or call: Q.E.D. Information Sciences, Inc.



141 Linden Street
Wellesley, Massachusetts 02181
Tel. (617) 237-5656

LEAD SOFTWARE PROGRAMMER

Ralston Purina Company's Data Processing Department is seeking a Lead Software Programmer to analyze, evaluate and implement IBM supplied software and assist Systems and Programming personnel in the most efficient utilization of operating system software.

The successful candidate will have:

- ... 4-5 years of Systems and DP experience.
- ... A college degree.
- ... Knowledge of assembler language.
- ... 2 years' experience in maintenance or development of software systems for large scale equipment.
- ... MVS or TSO experience is desirable; JES knowledge knowledge will be considered.

If you are seeking a professional growth opportunity with a successful people-oriented company, please send your resume in confidence to:



Ralston Purina
Company

John D. Rieser, Manager
Corporate Employment Services
RALSTON PURINA COMPANY
Checkerboard Square
St. Louis, Missouri 63188
An Equal Opportunity
Employer M/F

**SENIOR ANALYSTS
ANALYST PROGRAMMERS**

Leading manufacturer of food equipment systems and KitchenAid home appliances has responsible positions open in a growing EDP organization for Senior Analysts and Analyst Programmers. Candidates should have exposure to formal systems methodology and be familiar with large scale IBM equipment. COBOL programming experience is necessary. Assembler and/or CICS experience is also desirable.

Background should center in one of the following applications:

Manufacturing systems, including:
inventory control, material requirements planning, production planning, capacity planning. Knowledge of chain file management system is a strong plus.

Financial and/or marketing distribution systems, including: financial reporting, flexible budgeting, order entry and order control.

If you are a professional with strong written and oral communication skills, as well as problem solving ability... and would like to put those skills to use in a position offering competitive salary, excellent fringe benefits and career growth, send your resume in confidence to:

Manager Salaried
Personnel Employment



WORLD HEADQUARTERS
TROY, OHIO 45374

An Equal Opportunity Employer, M/F/H.

**DATA PROCESSING
PROFESSIONAL**

OPPORTUNITY for an individual to join a small team of professionals in the systems development section of a MIS facility. The facility currently supports an integrated data base for financial, personnel, billing, inventory, and fleet maintenance serving multiple municipalities; with future development to include law enforcement, fire assistance, and land use planning.

RESPONSIBILITIES will include all communications with user departments necessary for definition, design, and development of real-time and batch applications; recommending improvements in development methodology, assisting in training of junior personnel, and timely completion of all projects.

REQUIREMENTS include degree in computer science, or equivalent experience; commitment to complete CDP requirements; activity in professional associations; ability to facilitate projects with minimal supervision, thorough knowledge of CCP and RPG; and a commitment to providing the best in user services. Experience with S/360/370, DOS/OS/VS, a plus. **HARDWARE** is IBM S/3-15, 128K, 3340, tape and 3270s. **BENEFITS** are excellent. If you are interested in working in a progressive environment, and satisfy all requirements, then provide a resume, samples of written communications, and salary history to:

Personnel Office
City of Naperville
175 W. Jackson Ave.
Naperville, IL 60540
Equal Opportunity Employer

SYSTEMS ANALYST

Develop retrieval systems associated with a statistics instructional system; design, test, and document programs; conduct short instructional sessions for users; adapt programs for use on other systems; supervise programmers. Minimum qualifications: Bachelor's degree; 3 years experience and possess communication skills. Mathematical and statistical skills, DEC-10 experience and experience with large data collections preferred. Position available March 1, 1977, contingent on grant approval. Forward resume no later than February 21, 1977, to:

Search Committee
Academic Computing
University of New Hampshire
Durham, N.H. 03824
An AA/EOE

**DATA MANAGEMENT
SYSTEM PROGRAMMER
ANALYSTS**

Design... Development... Implementation. Junior, Intermediate, Senior Positions available in our center-city Philadelphia location, on a new, long-term program.

Desired types of experience include:

- UNIVAC 1110/1108/1106
- Assembly level programming
- Data management systems.
- On-line systems.
- Relational data systems.

Send your resume, complete with salary history, to: Personnel Department, AUERBACH ASSOCIATES, Inc. (AAI), 121 N. Broad St., Phila., Pa. 19107.

AUERBACH ASSOC. INC.
Equal Opportunity Employer

**FINANCIAL SYSTEM
PROJECT LEADER**

We are seeking a Financial System Project Leader for a multi-institutional, educational computer network.

REQUIREMENTS

- background in programming with particular emphasis on financial systems, on-line systems, or data base management technology
- demonstrable leadership qualities
- implementation project experience

**DESIRABLE QUALIFICATIONS
INCLUDE:**

- previous project management expertise in the above areas of computing and/or financial management of educational institutions

Send resume to:

CW Box 4895
797 Washington St.
Newton, Mass. 02160

SYSTEMS ANALYSTS

Career Opportunities for Experienced Systems Analysts in the York Division's Data Processing Function.

Minimum 2-5 Years Designing Systems for a Manufacturing Facility. Prior Programming Experience and a Degree Preferred. IBM 370/DOS or DOS/VS Required.

Send Resume to: Mr. N.J. Gainer, Mgr. Professional and Technical Placement.



York Division, Borg-Warner
P.O. Box 1592, York, PA 17405

An Equal Opportunity Employer M/F

Programmer / Analysts

Polaroid is looking for experienced Programmer/Analysts and senior level technical problem solvers to meet the challenges of our Boston area Corporate Systems Division.

As the recognized trendsetter in photographic innovations and the number one company in the technology of instant film and cameras, we work in a dynamic environment and offer continuous professional challenges in the software area. Utilizing state-of-the-art software, our Programmer/Analysts openings offer computer professionals the opportunity to take on a variety of application challenges, supporting Marketing, Distribution, Finance, Inventory Management and Systems Programming.

Polaroid is a highly people-oriented organization where personal rewards and professional excellence work together in an innovative technological atmosphere to bring about both individual and corporate growth.

If you are proficient in COBOL/IMS, Systems 370 Software and/or FORTRAN, possess an appropriate Bachelors degree and have several years of business programming experience, please send your resume with salary requirements to Pauline Calabro, Personnel Dept., 1265 Main St., Building W2-2D, Waltham, MA 02154. All inquiries will be acknowledged.

An equal opportunity employer M/F

Polaroid

WANTED:**Hardware/software experts
to help build new
computers to match the
world's best software.**

Telefile Computer Products, Inc., the only supplier of new peripherals and main memory for Xerox computer users, is embarking on a new challenge:

The development of two new Sigma computers. They will extend the line's capabilities well into the 1980's and take full advantage of Xerox' state-of-the-art CP-V and CP-R operating systems... software that the latest Datapro Research survey* shows as ranking first in the world.

Sigma 9 computer

- Will be micro-programmed
- Schottky MSI circuitry
- Prototype completion 12/77
- Full production by 12/78

Sigma 11 computer

- 4 X faster than present S9
- One-half the price
- ECL logic
- Full production by 12/79

All standard Telefile and Xerox I/O processors, main memory, and peripherals will be plug-compatible with both machines.

Telefile, located in the heart of California's sun-filled, dynamic Orange Coast, is staffing up now and needs these highly skilled professionals to help:

- CP-V and CP-R Development Programmers
- Programmers (All Languages)
- CP-V and CP-R Analysts
- Firmware Designers
- Comp. Architecture Designers
- Semi and Core Memory Designers
- ECL Logic Designers

Only highly qualified applicants need apply for this exciting new venture with a computer company that has shown an average annual growth of over 50% five years in a row. Send resume and salary history to:

Mr. S.V. Edens, President
Telefile Computer Products, Inc.
17131 Daimler Street, Irvine, CA 92714

Telefile

An Equal Opportunity Employer M/F
*Computerworld, December 6, 1976



Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

**USE THE ATTACHED
ORDER FORM AND
THIS ENVELOPE FOR:**

- ☐ *a new subscription*
- ☐ *new address*
- ☐ *new title*
- ☐ *new industry*

Order form is attached through binding. Be sure to include current label or label information when making a change.

first class
permit no 40760
newton ma

BUSINESS REPLY MAIL *no postage stamp necessary if mailed in the United States*

postage will be paid by



COMPUTERWORLD

**797 Washington Street
Newton MA 02160**

CIRCULATION DEPARTMENT

position announcements

position announcements

position announcements

position announcements

position announcements

Systems Programmer

Our large computer group has an excellent opportunity for a Systems Programmer to be involved in providing software support to a user base on time-sharing production systems. You'll assist in monitoring and optimizing both hardware and software throughput. Ideally, you will not only have technical ability but also will be able to interface with Digital's internal management in helping them to project future in-house equipment needs.

This position requires a BS or equivalent knowledge of operating systems theory, and 2-3 years programming experience in assembly or higher level languages, such as COBOL, is preferred.

Forward resume outlining salary requirements to Carol A. Reed, Digital Equipment Corporation, 200 Forest Street, Marlboro, Massachusetts 01752.

digital
digital equipment corporation

an equal opportunity employer m/f

BOEING

Systems & Software Engineers

The Boeing Company has immediate opportunities for qualified Systems & Software engineers with experience in computer automation of large control systems for ELECTRIC UTILITIES. Applicants are needed for assignments in the following areas:

- AGC and Economic Dispatch
- Automatic Failover/Recovery
- Data Acquisition & Control
- Man-Machine Interface (Color CRT Displays)
- Real-Time Operating Systems
- System Architecture

Responsibilities will include advance concept design, system definition, detail design, checkout, integration and test and documentation.

Candidates must have a BS in Electrical or Electronic engineering or Computer Science and a minimum of two years experience directly applied to the Electric Utility industry involving real-time applications of computers in Supervisory Control and Data Acquisition. U.S. Citizenship is required.

Attractive salary, fringe benefits and moving allowances will be offered qualified candidates. And you will find living is a pleasure in the unspoiled Northwest with its many recreational and sports activities and relaxed life styles.

Please send your detailed résumé to The Boeing Company, P.O. Box 3707-EBH, Seattle, WA 98124.

An equal opportunity employer.

BOEING
Getting people together

FROM DESIGN TO VOLUME PRODUCTION

... complete, professional services for your product

We're in business to help . . . help you get your products to your market. Our modern 100,000 square foot manufacturing facilities and engineering staff of over 60 professionals are dedicated to providing cost effective answers to your product needs.

From circuit boards and subassemblies to complete ready-to-ship products, we can provide top quality, cost competitive services from concept to production for your electronic or electromechanical needs.

AVCO ELECTRONICS DIVISION

4807 BRADFORD DR. N.W.
HUNTSVILLE, ALA. 35895
(205) 837-6500

ENGINEERS & PROGRAMMERS Systems-Software-Firmware

NCR's Terminal Systems Division in Millsboro, Delaware has unparalleled career opportunities for individuals interested in advancing state-of-the-art in POS terminals.

SYSTEMS PROGRAMMER/ ENGINEER

- Requires a background in minicomputer or microprocessor systems and/or associated application programming.
- Knowledge of structured programming and modular programming techniques.
- Knowledge of microprocessor hardware and software necessary as this lead position will involve communication with designers at all levels.

COMMUNICATIONS F/W PROGRAMMER

- Requires experience in data communications minicomputer programming at the assembler level.
- Experience with RJE-type communications and synchronous protocols preferred. Knowledge of SDLC fundamentals a plus.
- Responsibilities will include defining terminal F/W, interface within and influencing systems software architecture.

SYSTEMS I/O-F/W PROGRAMMER

- Requires experience in general purpose applications minicomputer programming of peripheral devices, at the assembler level.
- Experience in data management software between peripherals and main processor preferred.
- Responsibilities will include the definition and supervision of coding of applications oriented F/W to interface POS terminal peripherals to the base ECR.
- This is an individual contributor programming position in the development of new product software.

DIAGNOSTIC ENGINEER/PROGRAMMER

- Requires an engineer or hardware minded programmer with minicomputer programming experience and a flair for the challenge of diagnostic test software.
- Responsibilities include the generation of diagnostic firmware for retail POS terminals in a new product development environment.
- Position requires an individual with superior communication skills as job entails analyzing and recommending test firmware to various groups.

MANUFACTURING SYSTEMS ANALYST

- Inventory control, WIP, MRP and financial systems experience in a manufacturing environment required.
- Will design user specifications and interface with systems analysts to design advanced EDP systems
- Knowledge of COBOL, Assembler or NEAT/3 programming necessary as well as data base (particularly TOTAL) and on-line programming experience with Environ/1 or Intercomm desirable.

All positions require a BS in EE, CS or related discipline.

In addition to an unparalleled career opportunity within NCR, our Millsboro location offers comfortable living in a scenic and uncongested coastal area. The finest marine recreational areas, wildlife preserves, and beaches are within minutes of our Millsboro facility.

If success interests you, please send your resume to:

NCR

Mr. Ron Tull, Dept. CW-21
Terminal Systems Division-Millsboro
NCR Corporation
P.O. Box 607
Millsboro, Delaware 19966

An Equal Opportunity Employer

position announcements

position announcements

position announcements

position announcements

position announcements

Don't just look for a new job... "CYBERSEARCH IT!"


Cybersearch is a unique employment agency linked to one of the nation's largest computer networks.

Our personal service is confidential and without cost to you. We are currently searching to fill the following positions.

- SYSTEMS PROGRAMMERS/370 main frame \$25K
- SYSTEMS 3 RPG PROGRAMMERS \$18K
- ANSI-COBOL PROGRAMMERS \$15-20K

Call or rush resume to:

CONTROL DATA CYBERSEARCH

 an employment agency of

CONTROL DATA CORPORATION

214 N. Michigan Ave., Room 600, Chicago, IL 60601
(312) 454-8490

DATA PROCESSING PROFESSIONALS (ALL LEVELS)

We are assisting many different companies in their search for qualified personnel. Technical positions range from \$14-30; management positions from \$24-45. There are exceptional needs for technicians with Data Base, TP, or Compiler expertise. Management and Systems expertise in Retailing, Manufacturing, or Finance are also in great demand. Several openings exist for Documentation Analysts, Technical Writers, DBAs and Software Programmers. All positions are fee paid.

Call or write. All replies will be dealt with in a professional manner.

**W.A. HILL &
ASSOCIATES, INC.**
Kroger Bldg, Suite 2301
Cincinnati, Ohio 45202
(513) 241-1255

EDP PLACEMENT
SPECIALISTS SINCE 1969

Eastern Regional Sales Manager Computer Graphics

Expanding, respected, well-established leader in the computer graphics field seeks a polished sales professional able to take complete charge of a large network of sales representatives on the East Coast.

The qualified individual must have a good working knowledge of computer graphics, particularly incremental drum plotters. Ideally, you will have used or sold to timesharing services. Software experience is a definite plus.

We offer an attractive compensation and benefits package. Our continuing growth and technical accomplishments make this position particularly appealing to the career-oriented person who understands that advancement is contingent upon communication and achievement. For immediate consideration, send resume including salary history and background in confidence to: Mr. P.J. Monego.



Zeta Research

P.O. BOX 177 MONMOUTH BEACH, N.J. 07750

An Equal Opportunity Employer, M/F

MANAGEMENT OPPORTUNITIES SAN FRANCISCO

Our client requires two talented management-level professionals for challenging opportunities in the following disciplines:

Manager, Technical Support

Requires strong management and organizational planning abilities with strong technical experience (i.e., IMS, DB/DC, MVS, Heavy T.P. etc.). Must be currently managing a large systems support group in an advanced technical environment. You will have total responsibility for system programming, IMS data base group and applications support group, with 3 first line managers reporting directly to you. To 42K.

Data Base Manager

Are you currently managing a substantial data base team implementing IMS DB/DC? Then you qualify for an exciting position managing a DB team of strong DB technicians responsible for a major new large scale DB development.

You must be particularly strong in the DB portion but must also know DC and be able to create integrated large scale data bases. To 32K.

Advance your career today. Contact:

EMPLOYER RETAINED PERSONNEL SERVICE

303 Sacramento Street (415) 398-3535
San Francisco, CA 94111

**THE
COMPUTER
RESOURCES
GROUP INC.**

SOFTWARE DEVELOPMENT

When Was The Last Time
You Were Really Challenged?
Were You Able To Use Your Initiative
In Meeting That Challenge?

At Applied Data Research, a dynamic leader systems software products industry, we offer all the creativity, challenge and growth you could want — in a professional atmosphere. The following rewarding opportunities are immediately available:

SYSTEMS PROGRAMMER

- MVS experience highly desirable.
- Familiarity with OS internals essential.
- Computer science degree or 2 years experience.

PROGRAMMER/ANALYSTS

- Strong IBM Assembler language background.
- On-line system development experience an asset.
- Computer science degree or 2 years experience.

SUPPORT SPECIALISTS (2)

- Communication skills essential.
- BAL programming experience.
- One specialist in OS/VS and on-line programming
- One specialist in DOS/VS and CICS.

Please forward complete resume and salary requirements to:

SPD, Personnel Director

APPLIED DATA RESEARCH

Route 206 Center, CN-8, Princeton, N.J. 08540
An Equal Opportunity Employer

DATA PROCESSING/ SYSTEMS PROFESSIONALS

MAJOR SYSTEMS EXPANSION CREATES SIGNIFICANT OPPORTUNITIES WITH TIMEX

To meet the dramatically growing DP needs of our international corporation, we're currently developing a new financial information control system and a new manufacturing production control system — systems that will become an integral part of our worldwide telecommunications oriented computer network.

If you're a professional with qualifications we need, you can play an important role in the design and implementation of these systems. All positions are located at our corporate headquarters in Middlebury, Connecticut where you will be working with an IBM 370/158 installation which is the hub of a worldwide computer network. The software environment is VM, VS1, DOS/VS with CMS used for timesharing and interactive programming. The principal languages are PL/1, Assembler, APL and Basic.

SYSTEMS ANALYSTS

Analyze, design, implement and maintain new systems required by in-house users. Assignments include utilizing DP resources to effect quick installation of new systems... and analyzing cost savings realized by the introduction of these new and modernized systems.

Requires proven problem-solving abilities along with knowledge of the following: current computer capabilities and limitations, modern programming methods, user requirements and systems.

SYSTEMS SUPPORT ENGINEER

Support microprocessor software and hardware design and provide expertise and guidance in computer aided design projects. Also coordinate information interchange.

Requires BSEE or BS in Computer Science with two to five years experience. Must have knowledge of microprocessor hardware and software and computer aided design. Ability to effectively communicate complex engineering abstracts also necessary.

COMMUNICATIONS PLANNER

Plan, design and install data transmission networks and assist systems analysts and designers in planning communication segments of systems. Also analyze current and planned network usage and develop recommendations to management for improving network utilization.

Requires a BS degree in Communications Engineering or equivalent — and four to six years experience including training in terminal-oriented systems, communications systems programming, communications access methods, line control techniques and time sharing concepts and techniques.

SUPPORT SUPERVISOR

Direct the planning, scheduling, input/output control and job setup and control activities of the Data Processing department. Balance operation's requirements, optimize work flow and resolve conflicts in schedules or resource requirements.

Requirements include a BS degree or equivalent with special emphasis on Industrial Management. Plus four to six years of DP experience. Must have knowledge of supervisory techniques, work planning, production control methods and hardware and operating systems.

OPERATING SUPERVISOR

Responsible for production of all data processing jobs. Work closely with Production Support Supervisor and Performance Evaluation Analyst in problem determination and resources availability.

Requires minimum two years of college or equivalent. Plus six years of data processing experience. Must have expertise in computer operations, data processing concepts, operating systems and JCL. Strong supervisory and communication skills necessary.

All positions offer fully commensurate salaries and a number of excellent benefits. To apply, please send your resume, including salary history, to: Mr. S. Cutler.

**TIMEX
CORPORATION**

Waterbury, Connecticut 06720
An Equal Opportunity Employer, M/F

position announcements

position announcements

position announcements

position announcements

position announcements

EDP AUDITOR

Two positions open in a recently created dept. EDP audit resp. will span both operating divisions & MIS personnel. Exp. in corp. auditing &/or CPA firm + hvy EDP systems is absolutely required. \$20,000 (fee paid). Contact P. Siegal in confidence.

ROBERT HALF PERSONNEL AGENCIES
1310 Liberty Bank Bldg
Buffalo NY 14202
(716) 842-0801

SYSTEMS ANALYST**MINORITY & NON-MINORITY OPPORTUNITIES**

- New Jersey Location
- Large Food Distributor
- Growth Prospects

Join us for interesting work in a pleasant, professional relaxed atmosphere. Distribution industry experience will be particularly valuable along with background on 370 equipment. This position calls for a Systems Analyst with at least 3-5 years of programming experience plus 1-2 or more in systems analysis.

Attractive compensation includes liberal benefits. Please send resume including salary history and requirements in confidence to:

Director, Industrial Relations
DEPT CW

ROYAL FOOD DISTRIBUTORS, INC.
215 Blair Road

Woodbridge, New Jersey 07095
No Agencies or Calls Please

An Equal Opportunity Employer M/F

FLORIDA

Software Manager. Small sophisticated group. PDP-11 exper. \$30,000.

Programmers. PDP-11. RSX-11 exper. a plus. To \$20,000.

Call Jack Cole
(512) 349-1151.

Engineering / EDP Search, Inc.
personnel consultants

84 NE Loop 410, Suite 124E
San Antonio, Texas 78216

MANAGER, UTAH DATA PROCESSING

Manage Centralized State Agency Computer Center

3 Meg 158, 300 Terminals,
150 People, \$8 Million Plus,
With Pressures to Grow Many-Fold
Salary Range \$29K-\$40K

CONTACT:

Dr. John L. Gunter, Director
Systems Planning

220 South 2nd East, Suite 430
Salt Lake City, Utah 84111
(801) 533-6300

There's Still Room on the Ground Floor at Amdahl

FIELD SYSTEM PROGRAMMERS

We are generating constant field openings in concert with the rate at which 470V/6 shipments are growing. We need individuals with both the attitude and aptitude to carry our enthusiasm for unparalleled software support into the field. Immediate opportunities exist throughout U.S. and Canada.

You should have a need to feel useful to Amdahl users in a mixed-vendor environment and have a propensity for exuding the Amdahl enthusiasm. You must have a firm grasp on software systems, in-depth knowledge of large system internals (OS/MVT, VM, VS2, SVS, or MVS) and excellent diagnostic ability. Please indicate 362-E on your response.

FIELD ENGINEERS

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in California on full salary with housing, transportation, and other expenses provided. You will carry the Amdahl philosophy of customer service as well as your expertise into the field, utilizing your initiative and talents to aid the customer in restoring computer center operations regardless of the origin of the failure. Large system experience essential, preferably on compatible equipment. Please indicate 560-E on your response.

SYSTEMS ANALYST

You will analyze and support Engineering's requirements for change control. You are familiar with product control systems and large data base packages and, hopefully, with the manufacture of software. Please indicate 437-E on your response.

**FIELD ENGINEERS:
TEMPORARY DUTY IN EUROPE**

Immediate openings for field engineers to work at Amdahl installations in Europe as an initial assignment. You will join the permanent field engineering staff, with your first assignment being approximately six months in Europe. Same qualifications as stated elsewhere in this ad for field engineers. Please indicate 905-E Europe on your response.

Positions offered in this advertisement represent immediate openings only. If you have any talents that you believe could be exercised in the exciting Amdahl environment, please feel free to write us.

amdahl

PROGRAMMER**Blue Cross of Western Pennsylvania**

is seeking candidates for an opening in its Systems Department. This position offers both an attractive starting salary and an excellent employee benefits package.

Applicants should have a minimum three years' business programming experience with a medium to large scale IBM 370 OS Cobol configuration.

Send resume, detailing work history, educational background and present salary to:



William C. Cunningham
Personnel Department

Blue Cross

of Western Pennsylvania

One Smithfield Street
Pittsburgh, PA 15222

An Equal Opportunity Employer M/F

• Registered Mark Blue Cross Association

COMPUTER SCIENCE INSTRUCTOR

Full-time position beginning September 1977. Ph.D. in Computer Science preferred, but exceptionally qualified individuals without Ph.D. will be considered. Applicants must be able to design, develop and implement a newly-approved Computer Science concentration. Experience in "real world" applications areas strongly preferred. Apply to:

Dr. Arthur L. Hilt
Mathematics Department
Albright College
Reading, PA 19604

An Equal Opportunity Employer

SYSTEMS ANALYST SOFTWARE

This giant in the energy industry will provide broad exposure to new techniques in an IMS environment. If you have IBM 370 OS BAL and familiarity with OS/MVT/ASP, here is opportunity to grow. \$24,000. FEE PAID

ROBERT HALF PERSONNEL AGENCIES
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

Data Base Administrator

We seek a professional who can bring strong data base skills to a newly created department featuring an IBM 370/158 and 370/168 under OS/MVS environment.

This corporate headquarters position will offer broad scope responsibilities that include designing, monitoring and improving the operations of corporate data base systems as well as providing consultation and education service on data base technology.

Degree required; advanced degree preferred. Background in a large-scale data base/data communications environment along with applications experience essential.

Selected candidate will enjoy fully commensurate salary, excellent benefits and the potential for continuing career growth. Pleasant New Jersey location offers a choice of urban or suburban living. Please send resume, including salary history, in confidence, to Ms. G. Milsom.



MERCK & CO., INC.

Rahway, New Jersey 07065

An equal opportunity employer, m/f

position announcements

position announcements

position announcements

position announcements

position announcements

National Semiconductor Computer Products Group

We are currently seeking several creative managers with success in a competitive marketing or engineering environment. These are top level opportunities to participate in a growth company in positions that bear directly on National's continued success and provide extensive visibility into profit and loss business management. All positions are immediately available in our corporate offices, located on the San Francisco peninsula.

Director End User Marketing

World-wide marketing and sales responsibility for end user oriented memory and mainframe computers. This will include total sales responsibility, strategic market/product planning, product support and field service. Candidates must have top marketing/sales management experience in the general purpose computer business. Background should include IBM and anti-IBM experience.

Product Marketing Manager Large Computer Systems

This position will entail total product marketing and product management responsibility for end user general purpose IBM compatible mainframes. Ideal candidate will have a proven track record in general purpose mainframe marketing management. We prefer some direct sales experience. IBM and anti-IBM experience preferred.

For immediate consideration...forward your detailed resume in complete confidence to, or call COLLECT, Bob Hasselbrink, [408] 737-5640.

We offer excellent compensation and benefits.

National Semiconductor Corporation,
2900 Semiconductor Dr., Santa Clara, Ca. 95051

We are an affirmative action equal opportunity employer male and female



**National
Semiconductor**
SYSTEMS DIVISION

Manager Computer Operations

Our major Fortune 500 corporation is seeking a degreed individual experienced in managing a large scale computer center, to coordinate the activities of our corporate EDP operations utilizing Honeywell 66/20. Responsibilities include supervision of time sharing, on-line data base applications, communications and conventional batch processing as well as managing three process control computer centers that drive the material handling systems in our processing facilities.

The professional who joins us will find an excellent compensation program including outstanding company benefits with cash bonus as well as strong career growth potential. For consideration, forward your detailed resume with salary history, in complete confidence, to:

CW Box 4897
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer

Enjoy a career in an academic setting

Columbia University offers a varied and flexible growth environment to PROGRAMMER/ANALYSTS. We are currently upgrading our computer facilities and during 1977 will install an IBM 370/148, which will be integrated with our current 360/91/75 ASP system. We are looking for PROGRAMMER/ANALYSTS to work with our financial/accounting systems. They should have solid COBOL programming experience and familiarity with one or more of the following: JCL, OS Utilities, 360 OS MVT ASP systems, VM VS1.

If you would like to work in an academic environment that offers a flexible and stimulating work atmosphere, with benefits which include four weeks vacation and tuition exemption for self and family, send your resume and salary history to Employment Office, COLUMBIA UNIVERSITY, 209 Dodge Bldg., 116 St. & Broadway, New York, N.Y. 10027. An equal opportunity/affirmative action employer, M/F.

Columbia University

Nova Systems Programmer

Leading So. California manufacturer of computer systems is seeking an individual with 5 or more years of experience on Data General Nova operating systems. Will be heavily involved with the development of peripheral subsystems such as discs, tapes, terminals, etc. Development experience with hardware/software interfaces a must and will function as a "key" individual in this effort. Strong assembly language programming also required. BS in Computer Science or equivalent technical field required. Liberal relocation policy and top fringe benefits features.

P.S. Today's local weather forecast - 70°

Please send a copy of your resume and specific salary history to:

CW Box 4899
797 Washington St.
Newton, Mass. 02160

An equal opportunity employer M/F

MARSHALL UNIVERSITY
Huntington, West Virginia 25701
ASSISTANT PROFESSOR (College of Business and Applied Science - Department of Computer and Information Sciences). Salary range: Dependent upon qualifications and experience. Professional experience in academic life and business will be considered in making selection and determining rank and salary. Minimum qualifications: An appropriate doctoral degree with commitment and competence as a teacher and researcher. Responsibilities: Duties will include teaching undergraduate and graduate students in Computer and Information Sciences and closely related subject areas. In addition, incumbents should engage in meaningful research, perform professional service activities, and the normal faculty duties associated with a teaching appointment. Appointment date: August 22, 1977. This appointment is a regular probationary appointment. Application deadline: April 1, 1977. Send applications and credentials to: Mr. Charles Cochran, Chairman, Department of Computer and Information Sciences, College of Business and Applied Science, Marshall University, Huntington, West Virginia 25701. Telephone: (304) 696-2313.
An equal opportunity employer

EDP

SPECIALISTS

Nationwide

- Systems Mgr Mfg To \$25M
New Hampshire
- Sr S/A Chicago To \$24M
Project mgt respons
- Hrdwre/swtware specist To \$24M
S. West, state of art

Fees assumed by client co's

LESLIE, KAVANAGH

505 5th Av, NY, NY 10017
(212) 661-0670 (agency)

Corporate Inquiries Welcome

RESEARCH ASSOC.

N.E. Corp seeks indiv for R&D staff to define & plan market & product potential for its services. Graduate degree in O/R is pref'd. Data processing exposure helpful. Salary to \$24,000 (fee paid). Contact Stan Durbas (in confidence)

ROBERT HALF
PERSONNEL AGENCIES

111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170

COMPUTER APPLICATIONS ANALYSTS

San Francisco Bay Area

STANFORD RESEARCH INSTITUTE has immediate openings for experienced Scientific Programmers in FORTRAN, COBOL or other high order languages.

Our Analysts are responsible for analysis and design of computer applications as well as coding, debugging and documenting of scientific data processing problems.

We prefer an advanced degree in Computer Science, Mathematics or other scientific disciplines.



Our full range of benefits includes a SRI-paid retirement program. Please send your resume, including salary history to J.R. McDonald, Professional Employment, SRI 2333 Ravenswood Ave., Menlo Park, CA 94025.

An equal opportunity employer.

Systems Programmers

San Francisco Peninsula

If you have a degree and a strong background in assembly language programming with experience in the design and implementation of complex, sophisticated systems, then we may have just the opportunity for you.

Our development projects include telecommunications software involving microprocessors using SDLC and BSC line protocols, DBMS and operating system development for distributed processing, COBOL and PASCAL compiler development, and the industry's most sophisticated data entry systems, which require a broad range of knowledge involving telecommunications, operating systems, and real-time programming.

If you're looking for achievement with a dynamic, people-oriented company, send your resume and salary history, in confidence, to Tony Yates, Vice President of Systems Development (MC104), 19333 Valico Parkway, Cupertino, CA 95014. Equal employment opportunity is our pledge and practice.



Four-Phase Systems
Advanced Technology for Distributed Processing

position announcements

position announcements

position announcements

position announcements

position announcements

ACCELERATE YOUR CAREER WITH HONEYWELL!

The exceptional success of our new LEVEL 6 Minicomputers and terminals has created outstanding opportunities for experienced professionals at our Brighton facility. Investigate your possibilities in the Honeywell environment. You may find that the place to accelerate your career is right here!

Brighton

Industrial Engineers

You must be thoroughly familiar with work measurement, systems development, area layouts, and capacity analysis. At least 2 to 5 years appropriate work experience plus a degree or equivalent is required.

Production Engineers

Between 2 and 5 years experience in a computer manufacturing environment plus a BSEE or equivalent are necessary. In addition, some system test experience is desired.

Process Engineer

Degreed or equivalent plus 3-5 years experience in printed circuit board assembly, wave soldering, and manual soldering. A familiarity with automatic component sequencing and insertion technology desirable.

Process Engineer

Mechanical background preferable, familiar with typical machine shop equipment relative to high volume printed circuit board application. Should be hands-on individual who can demonstrate as well as document methods of operation relative to such equipment as N.C. Routers, high-speed drilling equipment, blanking and piercing techniques, etc. BS Mechanical Engineering or equivalent plus a high degree of experience in PCB machine shop practices, chemical experience in printed circuit board fabrication would be an asset.

Inventory Analyst (Material Control)

Analyst will participate in developing inventory projections, will monitor and analyze inventory variance according to plan, act as an interface with inventory accounting section, and will investigate specific inventory concerns. This job requires good analytical skills, an ability to communicate well, and a willingness to tackle projects. BS/BA or equivalent required with some finance or math background and 1 to 3 years of applicable experience.

Tool & Fixture Design Engineer

Detail and develop tool and fixture drawings that are utilized by vendors. 2-3 years experience and/or graduate of a recognized apprentice program required. A degree is an asset.

To investigate the preceding positions, please forward your resume, including salary history to:

Mr. John Gray, Honeywell, 38 Life Street, M/S 305, Brighton, MA 02135

Test Support Engineers

We're seeking professionals experienced in providing printed circuit board test support in an automated test environment, generating test programs and test procedures. A BSEE or equivalent and 2 years direct experience is required.

Quality Control Engineers

You should have a BS in Engineering or equivalent plus 2 to 5 years experience in Quality Control to qualify for this position. Some QC experience in PWB/PWA Fabrication is preferred.

Quality Control Engineers

This position requires a minimum of 3 years experience in Quality Control, primarily in the areas of electronic equipment final assembly/shipping operations. You should also have the ability to prepare inspection instructions and perform quality audits. A BS or equivalent is also necessary.

Quality Control Engineers

A minimum of 3 years experience in Quality Control Systems Test of minicomputers as well as a BS or equivalent are essential for these positions.

Vendor Engineers

We're seeking professionals with at least 3 years experience in Quality Control as vendor or component engineer with heavy emphasis on the testing and evaluation of integrated circuits.

To investigate the preceding positions, please forward your resume, including salary history, to:

Mr. Lou Sinagra, Honeywell, 38 Life Street, M/S 305 Brighton, MA 02135

Billerica

Product Planning

You will be responsible for short and long-range software product definition for original equipment manufacturer/system builder market segment.

You should have a minimum of 10 years software development experience with commercial systems builder applications. Extensive knowledge of minicomputer executives and language processors.

Product Assurance Engineering

Component Engineer

You will be generating new and revising existing electro/mechanical passive component specifications. You will also establish and implement qualification tests on state-of-the-art components, perform failure analysis, establish multiple sources plus manufacturing component problems.

You must have a BS or equivalent with a minimum of 2 years component experience.

Product Assurance

Product Evaluation Engineer - Terminals

You will be assisting in the development and qualification and certification test plans, and should be familiar with a variety of products such as communications terminals and peripheral equipment.

You will conduct product tests, identify problems, and effect plans for resolution.

You should have a BSEE or equivalent, a background in computer design/maintenance plus 3 to 5 years experience with terminals and/or peripheral equipment.

Product Evaluation Engineer - Small/Medium Systems

You will assist in the development of hardware and software test plans for our LEVEL 6 mini system and the LEVEL 62 and LEVEL 64 medium systems. Test development includes writing of programs and debug and execution of same for the purpose of qualifying new hardware and/or software.

You should have a BSEE or equivalent experience in hardware or software development, testing, or maintenance with 3 to 5 years hands-on experience with hardware and/or software.

Design Automation

Design Automation is the application of state-of-the-art computer technology to design new and more advanced computer products. At Honeywell, design automation involves the development of application software systems to aid the design fabrication, testing, maintenance and documentation of computers and terminals.

Our expanding Design Automation Group has openings for programmers and systems analysts at all levels of experience in the following areas:

- Design Automation
- Logic Test
- Graphics Applications
- Data Communications
- Engineering Applications

Software Engineering

You will be responsible for the design and implementation of test programs to qualify LEVEL 6 minicomputer software with particular emphasis in the areas of communications, executives, languages, and program development.

You should have a minimum of 3 years assembly language programming. Previous experience in communications would be a definite asset.

Technology Engineering

Diagnostic Design

You should be interested in the internal operation of minicomputer hardware and firmware. The items to be supported are largely communications, terminal, and I/O equipment attached to the LEVEL 6 minicomputer.

You will influence the design of hardware, firmware, software and documentation for maintenance capability. A large portion of your work will be the design, code and debug of test and verification or diagnostic programs.

The position requires a BSEE/MSEE or equivalent.

Technology Engineering

Circuit Design

You will perform circuit design and partitioning of LSI, CPU, and Peripheral Controller parts with heavy emphasis on logic definition as applied to LSI.

You should have a BSEE/MSEE or equivalent. Prior experience in microprocessors is desirable.

To investigate the preceding positions, please forward your resume, including salary history to:

Mr. Walter Orlow, Honeywell, 300 Concord Road, M/S 804, Billerica, MA 01821

Terminal Development Engineering

A number of positions are available in the Terminal Development Group working on the design of a new generation of microprocessor based video terminals. Specific assignments will include the design and implementation of software/firmware for the advanced terminal products.

These positions require 4 to 8 years assembly language experience with communications or microprocessor background.

Advanced Manufacturing

We have an immediate need for Test Technicians at our Billerica facility. Successful candidates will be involved with new product introduction from engineering prototype to final production modules. Applicants should be graduates of a technical school or equivalent and possess 3 to 5 years experience in Final Systems Test of mini computer systems. To investigate the preceding positions, please forward your resume, including salary history to:

Mr. John Knox, Honeywell, 300 Concord Road, M/S 804, Billerica, MA 01821

Honeywell

an equal opportunity employer m/f

position announcements

position announcements

position announcements

position announcements

position announcements

DIRECTOR MANAGEMENT INFORMATION SYSTEMS

We are looking for a Data Processing Manager who is seeking a new challenge where is presently second in command and is ready for the No. 1 job. This position reports to the Vice President of Administration and has responsibility for the management of the corporate E.D.P. effort including systems development, programming and the operation of an advanced computer facility.

Our requirements are a college degree — Master's preferred — and at least 10 years' of Data Processing experience. Your most recent experience should include Managerial responsibilities for a staff of professionals who design and implement sophisticated financial, marketing and manufacturing systems.

Action Industries, Inc., is a publicly-held, consumer-oriented company which has had an exceptionally good growth pattern over the last 5 years. This position is in our corporate headquarters in the Pittsburgh area. We offer a full range of company paid benefits, an attractive executive compensation program and a salary which is commensurate with the stature of the position.

Interested candidates should mail a resume to: T.J. Merriam, indicating current salary. All inquiries will receive a prompt response and be held in the strictest confidence.

ACTION INDUSTRIES, INC.
CHESWICK, PA. 15024

AN EQUAL OPPORTUNITY EMPLOYER M/F

OPPORTUNITIES in

New Hampshire
Supervisory
Union No. 29

We are looking for Talented and Dedicated people who like to tackle challenges

DATA PROCESSING MANAGER with at least three years of successful, responsible managerial experience in data processing. **PROGRAMMER/ANALYST** to assist Data Processing Manager. Current configuration Neat/3 NCR Century 100, Cobol desirable. Experience in timesharing control programs and telecommunications also desirable. Proficient at programming for financial accounting, payroll, personnel data base, census, student scheduling, student grade reporting and inventory (educational hardware and software). The Data Processing Manager will be given an opportunity to give input in selecting his support Programmer.

APPLY TO:
Richard L. Champagne
Superintendent of Schools
Supervisory Union 29
34 West Street
Keene, New Hampshire 03431

Equal Educational Opportunity/
Equal Opportunity Employer

EDP OPPORTUNITIES MGMT SCI Operatns Resch design anal staff position, fincl applications fixed income, etc.

\$31-35M
MGR Software Honeywell 6000 \$30M

MGR P/S 370 State of the Art-staff of 20 \$27-32M
PROJECT Leader-PDP RSX 11M, WW communications \$26M

SYSTEMS Anal-370/158 VS 1, SYS 3-financial/advertising \$25-28M

DATA BASE Mgr-IDMS 370/158 Mod 3 \$25M

SYSTEMS Engr-line mgmnt mini computer \$25M

PROG Anal-new design CICS applications. \$23M

MGMT Sci-Oper resch mktg applications \$21-25M

SOFTWARE Support-Video 370 DOS/VS Sysgen \$21-23M

SYSTEMS Anal Programmer-DOS to OS factoring systems, 50% trvl. \$19-23M

PROG Anal-min 1 yr Fortran prog exp \$13-17M

PROGRAMMER-Mini computer environment seeks 1 yr \$12-15M

Bill Borrelli (212) 349-3610
William Harris Associates
150 Broadway agency NY 10038

EDP IN THE SOUTH

Trying to relocate South...? We offer professional representation by specialists who know both EDP and job search, and who are in contact with nearly all large installations in the South. One counselor specializes in working with BURROUGHS, HONEYWELL, NCR & UNIVAC shops. Client companies pay everything. Absolutely confidential. Send resumes to:

EDP DIVISION
JIM KING & ASSOCIATES

JIM KING

438 Gulf Life Tower
Jacksonville, FL 32207
(904) 398-7371

Send for our new free booklet on effective resume preparation.

MANAGER SYSTEMS ANALYSIS AND PROGRAMMING

National organization with headquarters in Washington, D.C. seeks dynamic data processing project manager. Candidates should possess at least B.A. degree plus 6 to 8 years experience in systems design and programming with a minimum of 3 years managerial experience with large scale project development and implementation. Telecommunications experience desirable. Company utilizes IBM main frame equipment with Cobol and ALC. Operates in both centralized and decentralized mode. Excellent benefits. If you can qualify and seek a challenging opportunity to be in on the ground floor of major national systems development effort, send your resume to:

F. CLEARY
Office of Personnel
American National
Red Cross
18th & E Sts., N.W.
Washington D.C. 20006
Equal Opportunity Employer

DIEBOLD
INCORPORATED

ON-LINE SYSTEMS SUPPORT EFTS/ATM/POS/ COMMUNICATIONS

People and computers — do you like dealing with both? Do you enjoy exercising your technical ability to solve customer problems in an on-line environment? Diebold offers rewarding positions in on-line systems support, where your responsibilities will be:

- consulting with key EDP personnel at Savings and Loans and Banks on all aspects of interfacing on-line automated teller machine terminals to their mainframe computers. We are already interfacing with IBM, Burroughs and NCR mainframes via multidropping and/or via our own controller unit.
- providing on-site technical assistance in terms of ensuring that the on-line ATM terminals are operational with the customer's host application programming.

Diebold has an established name in the banking equipment market place, with long history of corporate success. The market growth and Diebold's success have created the availability of On-Line System Representative positions in several cities. You can qualify if you have a degree plus seven to ten years experience in network-design, data communications and systems implementation.

We offer attractive starting salaries, excellent benefits and the potential to advance into increased responsibilities.

Send your resume or letter with salary requirements in confidence to:

Mr. Donald F. Bartoo
Manager, Marketing Services
Automatic Banking Systems
DIEBOLD INC.
5995 Mayfair Road
North Canton, Ohio 44720
An Equal Opportunity Employer M/F/H

DIEBOLD
INCORPORATED

DATA PROCESSING

SYSTEMS PROGRAMMERS

Large scale technical challenge
in a multiple CPU environment

Federal-Mogul Corporation, a Fortune 500, worldwide producer and merchandiser of precision components and accessories for the transportation, construction and manufacturing markets, will be sending Technical Services representatives into this area to interview accomplished DP professionals.

LOCAL INTERVIEWS

Call now, collect, to arrange a convenient time.

(313) 354-9860
IMS SYSTEMS PROGRAMMERS

You will need experience in IMS systems programming with complex, on-line logical data bases. Experience in IMS/VS and IBM performance tuning aids desirable.

SYSTEMS PROGRAMMER

A background in a large scale multi processor environment using OS or MVS is required. Strong talents in ALC and COBOL are also important, and OS and VS/MVS conversion experience is highly desirable.

We offer a competitive salary, full benefit package and excellent growth potential with our World headquarters in Southfield, an attractive suburban community. Please send your resume including salary history in confidence to: S.J. Hemack, MIS Recruiting, Federal-Mogul, 26555 Northwestern Highway, Southfield, Michigan 48034.

FEDERAL-MOGUL

AN EQUAL OPPORTUNITY EMPLOYER M/F

Systems Analysts Programmers Systems Programmers

(DOS/VS-VM)

An Invitation to Discuss A
Major Data Processing
Project Undertaking

We are a major midwest based insurance company planning a major project undertaking for 1977 and beyond. Plans for programs and equipment will result in tremendous opportunities for data processing professionals with two or more years experience with an insurance (preferably property and casualty) or financial services organization. Send resume or brief letter outlining experience, in confidence, to:

Mr. Howard Grigg
**NORTHWESTERN NATIONAL
INSURANCE GROUP**
731 N. Jackson Street
Milwaukee, WI 53201

an equal opportunity employer m/f

DATA BASE ADMINISTRATOR

We are a large corporation located in a highly desirable area of Southern California and engaged in high volume production of electro-mechanical products.

Our need is immediate for a data base administrator in an expanding data processing department. Responsibilities of the position are for the:

- Definition, generation and control of the data base;
- Establishment of standards and techniques to be used in programming applications for an integrated manufacturing data base using TOTAL DBMS package.

Candidate should have knowledge of:

- File structures
- File access methods and control
- Information retrieval techniques

A minimum of 6 years experience in analysis and programming on large scale IBM equipment, with a degree being highly desirable but not mandatory. Excellent benefit package available. Salary commensurate with experience.

Do you feel your experience matches the above? If so, let us hear from you by sending resume to:

MANAGER, SYSTEMS & PROGRAMMING
CW Box 4900, 797 Washington St., Newton, MA 02160

All responses will be held in the strictest of confidence. Our entire data processing staff is aware of this opening.

Equal Opportunity Employer M/F

position announcements

position announcements

position announcements

position announcements

position announcements

Enjoy a career in an academic setting

Columbia University offers a varied and flexible growth environment to SYSTEMS/APPLICATIONS PROGRAMMERS. We are currently upgrading our interactive programming facilities with the addition of new systems, among them an IBM 370/148, which will be integrated with our current 360/91/75 ASP system. We are looking for programmers with excellent written and verbal communication skills and experience with any of the following: OS/MVT, ASP, PL/1, social science applications, FORTRAN, teleprocessing and data base systems.

If you would like to work in an academic environment that offers a flexible and stimulating work atmosphere, with benefits which include four weeks vacation and tuition exemption for self and family, send your resume and salary history to: Employment Office, COLUMBIA UNIVERSITY, 209 Dodge Bldg., 116th St. & Broadway, New York, N.Y. 10027. An equal opportunity/affirmative action employer m/f

Columbia University

INDIANA POSITIONS

Data Comm.-TSO to \$23,000
IMS Data Base Analyst to \$22,000
D/B - CICS - Total to \$21,000
EDP Auditor to \$21,000
Programmer - COBOL to \$18,000
OS
Prog./Anal. - COBOL to \$16,000
ALC

Partial listing

Call or write:
(317) 257-9281

SHILOVE PERSONNEL SYSTEMS
6100 N. Keystone Suite 557
Indianapolis, IN 46220

DP PROJECT LEADER

Large Southeastern corporation seeks experienced DP professional to lead engineering programming group involved in electric utility transmission and generating planning and power system stability. Must have electrical engineering degree plus five years experience in scientific programming with background in IBM 370 environment. Position requires both administrative and leadership skills. We offer Atlanta location, excellent benefits and competitive salary. For prompt consideration, forward resume with current salary to:
W.H. Oliver
Southern Company Services, Inc.
P.O. Box 720071
Atlanta, Georgia 30346
Equal Opportunity Employer

SYSTEMS ANALYSTS AND PROGRAMMERS

A billion dollar Detroit financial institution is looking for EDP candidates. Immediate openings available for:

Sr. Systems Analysts

Candidates should have one to two years analysis experience, and three to four years programming experience. Background on Burroughs medium systems, preferably in financial on-line or customer service applications.

Programmer Analysts

The successful candidates will have three years programming experience in banking systems, experience on Burroughs medium systems, COBOL, and on-line application experience.

Salary commensurate with experience. Good fringe benefits. Send resume and salary requirements to:



Bank of the Commonwealth

719 Griswold
Detroit, MI 48226
Attn: Lanni Hight
An Equal Opportunity Employer

SYSTEMS-PROGRAMMER ANALYST

Opening for experienced Programmer with knowledge of Fortran, COBOL, and Assembler languages who desires to elevate skills to include systems analysis. The position requires the review of existing programs and information gathering techniques to revise and develop new systems to foster the utilization of epidemiological data.

Please send salary requirements and resume to:

Personnel Department
Michigan Cancer Foundation
110 East Warren Avenue
Detroit, Michigan 48201
An Equal Opportunity Employer

Systems and Programming Manager

Billings, Montana bank seeking individual with prior supervisory experience to assume responsibility of program development for on-line banking applications on medium Burroughs system. Send resume, including salary requirements to: T.R. Cover, P.O. Box 30918, Billings, Montana 59116.

SR. ANALYSTS PROG/ANALYSTS

The Pacific Northwest is unable to supply the increasing demand for professionals with H2000 or 270, Cobol or BAL exp. Salaries: \$25,000.
Call: (206) 453-0444 or send confidential resume to:

COMPUTER PERSONNEL & CONSULTS INC.
Suite 204
1 Lk Bellevue Dr.
Bellevue, Wash. 98005

SYSTEMS ANALYST

A major northeastern Ohio cold rolled specialty strip firm has an immediate opening for Systems Analyst. Position requires a minimum of 4 years experience in this work. This is an ideal situation to exert your creativity in connection with a new computer installation. There will be an opportunity to engage in systems analyst work with respect to virtually all phases of our business. Salary negotiable. Excellent employee benefits. Send resume and salary history to:

CW Box 4896
797 Washington St.
Newton, Mass. 02160
Equal Opportunity Employer M/F

DP PROFESSIONALS

All Jobs Fee Paid

BANKING
Systems Manager-Correspondent banking.
Programmer/Analysts-COBOL or ALC 370/OS or DOS
System Software-370 DOS/VS, OS/VS1, MVS or IMS.

MANUFACTURING
Consultant-IMS
Programmer/Analysts-IMS
Programmers-MRP, BOMP
Current openings in Most Southern states from Florida to California.

DUNHILL

Employment Agency
of Fort Worth, Inc.
901 Ridglea Bank Bldg.
Fort Worth, TX 76116
(817) 732-8191

The Professional Approach To Career Planning


The New 1977 Computer Salary Survey

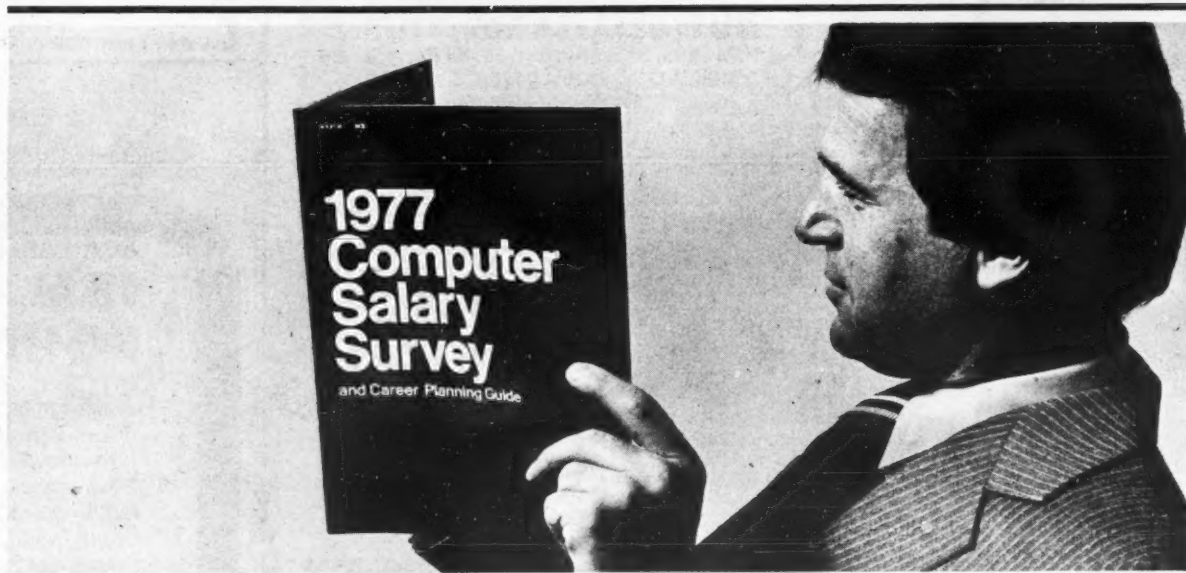
Call for your free copy today!

A successful career in today's computer field requires the same professional planning you'd use in developing a new program or system. Each step must be carefully planned to make sure you reach your career objectives on time while avoiding costly side-tracks. That's where the computer professionals at Source EDP and their new report, the 1977 Computer Salary Survey, can help you.

Together they'll work with you in determining your strengths and where you stand compared with others in salary, position and career potential. They'll help you establish a specific and realistic career plan that will carefully explore all of the alternatives available to you in reaching your career objectives. After fifteen years of experience, Source EDP knows exactly what you can do to gain broader exposure, maximize your compensation and break into management.

Call the professionals at Source EDP today! They'll send you your free copy of the 1977 Computer Salary Survey and start you on your way to a more rewarding and productive career. But do it now, it could be the most important phone call you've ever made.

source  edp



For your FREE 1977 Computer Salary Survey call the Source EDP office nearest you.

East
Boston 617/237-3120
Greenwich 203/869-5977
New York/New Jersey 201/687-8700
Philadelphia 215/665-1717
Washington, D.C. 703/790-5610

Midwest
Chicago 312/782-0857
Cleveland 216/771-2070
Detroit 313/352-6520
Kansas City, Mo. 816/474-3393
Minneapolis 612/544-3600
St. Louis 314/862-3800

South/Southwest
Atlanta 404/325-8370
Dallas 214/387-1600
Denver 303/773-3700
Fort Worth 817/338-9300
Houston 713/626-8705
New Orleans 504/561-6000

West Coast
Irvine, Ca. 714/833-1730
Los Angeles 213/386-5500
Palo Alto 415/328-7155
San Francisco 415/434-2410
Torrance, Ca. 213/540-7500

If unable to call, write:

Source EDP
Department C-5
721 Enterprise
Oak Brook, Illinois 60521

When writing please be sure to indicate home address and current position title.

position announcements

BOWLING GREEN STATE UNIVERSITY

Will have two permanent Assistant Professor positions as follows:

(1) Beginning Fall, 1977. Individual sought with interests in formal languages and automata theory capable of teaching entire undergraduate curriculum.

(2) Beginning Fall, 1978. Areas of interest should be computer organization and hardware/software interaction. Position involves supervision of student projects utilizing mini and microcomputers.

Both positions involve research and teaching at the undergraduate and graduate levels and require the Ph.D. degree. Application deadline for both positions is March 1, 1977. Write to Chairman, Department of Computer Science, Bowling Green State University, Bowling Green, Ohio 43403. An Equal Opportunity/Affirmative Action Employer.

SYSTEMS ANALYST To \$20,000-Virginia

Growing corp seeks to add Systems Analyst with Cobol and 3+ years exp in mfg applications. 370, on line, data base environment. Interesting and challenging opportunity. All fees paid. Contact George Nugent.

**FOX-MORRIS
PERSONNEL
CONSULTANTS**
409 Washington Ave.
Baltimore, MD 21204

SYSTEM PROGRAMMER OS/MVT \$25K

Multiple openings available for system programmers with experience in OS/MVT Internals, HASP Internals, and Teleprocessing. Currently using two 360/65's. Some DOS experience desirable. Salary commensurate with experience.

Send resume or call:
**MANAGER, SYSTEM SERVICES
MULTIPLE ACCESS, INC.**
1010 Westwood Blvd.
Los Angeles, CA 90024
(213) 474-6565

BUY SELL SWAP

"...extreme weather reveals underlying weakness in power grid."

BROWNOUT AND POWER FAILURE PROTECTION

▲ With more frequent occurrences of energy shortages and poor power quality, ATLAS Uninterruptible Power Systems have become a critical necessity for power-sensitive computer equipment.

▲ Unlike time-limited battery systems, an ATLAS UPS with diesel generator can supply power for a fraction of a second or for the duration of the outage.

▲ ATLAS offers the following UPS from stock, fully warranted, at a savings of 50% below the price you would expect to pay.

**125 KVA UPS
with General Motors
Diesel Generator
\$37,500**

ATLAS

9457 Rush St. El Monte, CA 91733
Main Office: 213-448-0705
IL 312-372-2237 MA 617-492-2525

buy sell swap

IBM UNIT RECORD EQUIPMENT

024 077 085 402 514 552 026
082 087 403 519 557 029 083
088 407 523 602 056 084 089
408 548 604 029 129

We Buy Sell or Lease
360s 1400s 1440s

IBM COMPUTERS

2040 GF, I/O Set
5 Spindle Calcomp 2314
6-60KB Tape Drives/Sims

Big Savings — up to 50% on
Short Term Rentals

Call us for all your needs; we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM Maintenance. Contact ACS for proposal.

ACS
7126 Mullins
Houston TX 77036
(713) 666-2122
TWX 910-881-1526

EQUIPMENT CORP.

buy sell swap

DEC

OEM's & End Users
C.D. SMITH

Broker in Used
DEC Data Systems
310 & 350 Series
Available

730 N. Post Oak Lane
Houston, TX 77024
(713) 965-0874

IBM 148

CONFIRMED DELIVERY
SECOND QUARTER

FOR SALE

MICOM INC.

11300 N. Central 301 E. Main
Dallas, TX Barrington, IL
(214) 691-3477 (312) 382-2800

BUY, SELL, OR LEASE

CALCOMP

CD 1015-215 dual density
CD 14-12-22 single density
IBM 2030-G, 128K, 1443-N1

Call Collect or Write:

COMPUTER SYSTEMS/GRAPHICS, INC.
2017 West 104th St. Leawood, Kansas 66206
(913) 649-2190

FOR SALE

(5) 129-03's
BUY/SELL/LEASE/TRADE

024	059	088	519
026	077	129	526
029	082	402	548
046	083	403	552
047	084	407	557
056	085	514	602

1401's 1130's 360's
Contact: Gene Nicholl
Gemini Computer Corp.
8585 N. Stemmons Freeway
Dallas, TX 75247
214-630-8355

FOR SALE HEWLETT-PACKARD

Complete Desk Top System. Includes HP 9830 Programmable Calculator (3.8 K bytes) with matrix, string variable and cross reference (Advance Programming I) ROMs; 2 tape drives, large carriage 9871 printer with backward and forward plotting capabilities and form feed control; Interface Card. Great for large data and complex programs. Original cost over \$15,000.

Must Sell.

Call (212) 344-8570

BUY/SELL/LEASE/TRADE

IBM 360s, 370s, System 3s, all Peripherals
3830s, 3333s, 3330s, 3420s, 3803s

Purchase/Leaseback Machines Wanted
All types 1400 Series; 1130s; 1620s
Unit Record Equipment Refurbished — All Models
Disk Packs — recertified, initialized

Call collect today (214) 634-2750

METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg. 1111 W. Mockingbird Lane
Dallas, Texas 75247 TWX 910-861-4171

FOR SALE Xerox/Honeywell Sigma 9 Memory Model 8610 E

128K 4 Port Access
Memory with Power Supplies
Model 7277 Disk Drives
Immediate availability - excellent condition.

Contact:
J.W. Caravello
Director of Operations
COMSHARE, Inc.
P.O. Box 1588
Ann Arbor, MI 48106
(313) 994-4800

SPECIAL

360/40 196K (Loaded)
High Speed IO Set
(4) 2314 Disk Drives
\$129K Cash
(Will Take Trades)
(2) 360/30 128K CPU
\$17.5K Each

SHIP TODAY FROM
LOS ANGELES
(713) 629-4400

WANTED

ALL 360 AND 370 SYSTEMS
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata

Member
Computer Dealers
Association

P.O. Box 47762 Dallas, Texas 75247 PHONE (214) 631-5647

buy sell swap

PLANNING TO SEND IT BACK?

Call Us First For IBM 370 Mainframes
on MAC or TDP — Also Buying Order Positions

CONTACT: Ted Moulder

A.M.G. EQUIPMENT SERVICES, INC.
99 Wall St. New York, N.Y. 10005
(212) 747-0670 (800) 221-2674

FOR LEASE

Available 3-1-77
370/135 GF #61928

Features;
1421, 3900, 4655,
4670, 4672, 6981,
7861, 8637

Power Unit
Console Printer

3340 - A2
3340 - B2

RALPH GRAVES
214/630-6700



Pioneer Computer Marketing
1165 Empire Central Place
Dallas, Texas 75247

Wanted to Buy Basic Four System Model 350 or 400

Charles Rothman Company, Inc.
72 Clifford Street
Providence, RI 02903
(401) 331-1769

DEALERS WANTED

Typetronic

MINI-COMPUTERS

Nova Compatible minicomputer multi-terminal & multi-job T/S system with Business Basic, Software application packages, 10 million char. Disk. 8 Port Mux, 24x80 CRT, KSR 132 Cols 85LPN Printer.

DEALER COST \$26,500
Your Efforts Supported By:

• SALES TRAINING
• PROGRAMMING SERVICE
Five Sales per year earn you \$50,000. Plus!

Contact: Peter L. Richards, Pres.
DOLLAR PLANNING, INC.
E-210 Rte. 4
Paramus, N.J. 07652
(201) 843-4904

370/125's

For Sale* Lease* Purchase
*Purchase Leaseback

Specialists in 125 Systems



**CORPORATE
COMPUTERS, INC.**
(203) 661-1500

Member
CDA

115 Mason St., Greenwich, CT 06830

We encourage your inquiry about our unique programs for both purchased and leased equipment.



AVAILABLE FOR LEASE IBM SYSTEM/370 EQUIPMENT

- 370/125 MODEL H00 CPU
With features as required.
(Available June, 1977).
For sale also.
- 370/135 MODEL H CPU
With features as required.
(Available July, 1977).
- 370/148
(Available late May, 1977)
- 370/158 EXPANSION MEMORY
(Available now).
1.5 megabytes of IBM storage
to expand your CPU from Model I
to Model J, JI or K.
- 370/168 BUFFER EXPANDER
(Available now).
Feature 1435 to expand your
3168 buffer memory.

FINALCO

Computer lease underwriters and asset managers
8150 Leesburg Pike • Vienna, Virginia 22180 • (703) 790-0970

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

Lear Siegler

CRT TERMINAL — IN STOCK —

Sales • Lease • Full Service

ADM-1 — Special*

ADM-2 — \$2445

ADM-3 — \$975

Available with the options you want.
All new equipment — Completely checked out.

* ADM-1 — \$1795 with 24 lines, edit pkg, printer output and RS 232 ext.
ADM-3 — \$975 — we will add the features you want.



INSTRUMENTATION SALES CO.

171 E. Ridgewood Ave., Ridgewood, N.J. 07451
(201)445-5210 (212)695-4269 TWX (710)988-5609

**DEC HAD A PRICE INCREASE
BUT WE DIDN'T**
DEC PDP-11/70 System with RSTS/E Application
Packages available at old prices.

- General Accounting Application Package
- Materials Management System

Offer good until February 15, 1977
If you can act fast, call Peter Melvin at (617) 890-9393.

460 Totten Pond Road,
Waltham, MA 02154

INTELLIGENT SYSTEMS

(617) 890-9393

THE PRICE IS RIGHT! FOR SALE-360/40

TYPE	MODEL OR FEATURE NO.	DESCRIPTION	SERIAL NO.
2040	GOO	Central Processor	22067
	3237	Decimal Arithmetic	
	3274	Direct Control	
	4457	1401/1440/1460 Compat.	
	4460	1401/1440/1460 DOS Compat.	
	6980	Selector Channel 1st	
	6981	Selector Channel 2nd	
	7520	Storage Protection	
	7920	1052 Attachment	
1052	007	Typewriter Keyboard	59225

Located at Comma Corp. - Dallas Texas Available Immediately
Maintenance Qualifications: IBM Qualified



Data Automation Company, Inc.
4858 Cash Road, Dallas, TX 75247
(214) 637-6570

We encourage your inquiry about our unique
programs for both purchased and leased equipment.



FOR SALE OR LEASE

HONEYWELL 200/2000/6000

- MODEL 2201-6 CPU (98K)
Available April 1977
Includes 0191(1), 1115(1), 1117(1),
1121(1), 213-3(1), 203B-4(1),
204B-8(7), 223(1), 222-6(1), 032(1),
220-3(1), 257-1(1), 273(2).
- OTHER HONEYWELL CPUS AND
RELATED PERIPHERAL EQUIPMENT
Available now.
Will be configured to meet your
requirements.



Computer lease underwriters and asset managers
8150 Leesburg Pike • Vienna, Virginia 22180 • (703) 790-0970

JAMES COMPUTER CO.

BUY/SELL/LEASE/TRADE			
024	059	088	519
026	077	129	526
029	082	402	548
046	083	403	552
047	084	407	557
056	085	514	602

1401's • 1130's • 360's
Your source for guaranteed equipment
James Computer Co.
4970 Marine Drive / Chicago, Illinois 60640
Natalie Reyes (312) 271-3311
(312) 728-6871

For Sale

IBM TAPE DRIVES

One 3420 Model V Feature 3550
(Dual Density 800-1600)
Two 3420 Model IV Feature 6420
Two 3420 Model VI Feature 6420
April 1 Availability

Call or write Harry Ludke, Room
460, 2610 University Ave., St.
Paul, MN 55114, (612) 373-4555

SELL • BUY

TELETYPE

Models 32-33 New, Used

Telex • TWX/DDD

BRPE'S

NATIONAL

TELETYPEWRITER CORP.

207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

FOR SALE BURROUGHS B3500

120 KB Core Memory
800 lpm Line Printer
(2) 800 BPI-9-Tr Tapes
800 CPM Card Reader
20M Bytes Disk (20 ms)

Ernie Lucken

Diversified Computer

Applications

2525 E. Bayshore Road
Palo Alto, Calif. 94303
(415) 324-2523

Sacrifice

Approximately 1100
Accounting Machine Ribbons
New mfg. by Curtis-Young
14-1/2" x 15 yds
C-Nylon black offset, medium inking
Boxed Individually
Also have boxes of paper

Jim Meadows
PO Box 549
Shepherd TX 77371
(713) 628-6614
or 628-3369

For Sale

UNIVAC (RCA) 70/45

IMMEDIATE DELIVERY

Call Don Groetzinger
Western Publishing Co.
(414) 633-2431

FOR SALE OR LEASE

IBM Sys/3 Mod 10-Disk

5410-A14 16K CPU

3971 Prt Attach

4100 MFCU Attach

4110 Prt Kbd Attach

5203-2 200LPM Prt

5560 132 Prt Pos

5424-1 MFCU 250/60/60

5444-2 4.9 M Disk

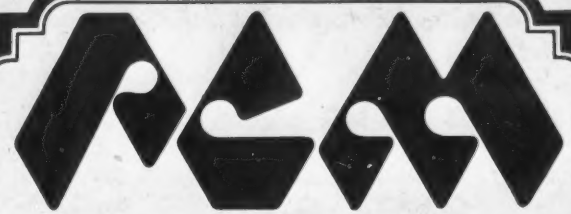
5471-1 Prt Keyboard

SHARED MANAGEMENT, INC.

76 Pratt

Johnson City, N.Y.

(607) 798-7805



BUYING SELLING LEASING

360/40 370/145 370/135
360/50 370/158 370/155
360/65 370/168 370/165

TAPES / DISKS / CORE

Pioneer Computer Marketing
1165 Empire Central Place
Dallas, Texas 75247

214/630-6700

BUY • SELL • LEASE

370/125
370/115



ECONOMIC COMPUTER SALES, INC.
1255 Lynnfield Road PO Box 17825
Memphis, Tenn. 38117 (901)767-9130
TWX810-591-1205

MEMBER COMPUTER
DEALERS ASSOCIATION

DIABLO HYTERM

MODEL 1620

\$2,795

Available at this price when pur-
chased or leased with any of the
Terminal Products listed be-
low...

Techtran Datasette from \$950
ADDS Video Display from \$1,595
Sykes "Comm-Stor" from \$2,495
Floppy Disk File

All equipment is new and carries a
full factory warranty.

TERMINAL MART

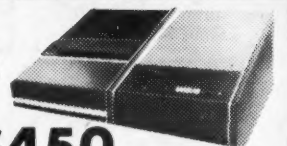
285 Madison Avenue
New York, N.Y. 10017
(212) 685-2679

AMERICAN USED COMPUTER CORPORATION

PRINTERS TALLY T132

100 LPM 132 COL

ORIGINALLY
\$5900 NOW \$450



CENTRONICS 101... \$1250

101A, 101AL, 102, 102A, 102AL, 306, 501, 508



DATAPoint 3300-200 \$475

NCR EMTAE
PARALLEL THERMAL
UNIT

IN STOCK NOW

MINIS

DEC 8, 9, 10, 11, 12, 15

DATA GENERAL 800/820 NOVA 2/10, 1200

HONEYWELL 16 SERIES; GAI SP 16/40

LOCKHEED MAC 16; RAYTHEON 704

GRI 909; CAI LSII, 808; SEL 810, 840

VARIAN 520I 620I; GTE TEMPO 1

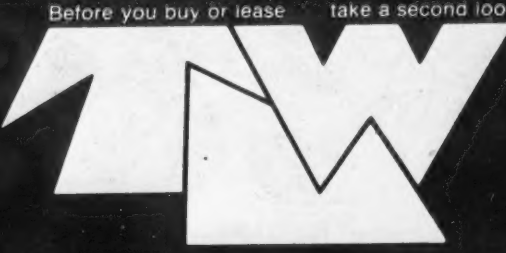
617-261-1100

PO Box 68, Kenmore Station, Boston, MA 02215



buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap
---------------	---------------	---------------	---------------	---------------

Before you buy or lease take a second look



BUY-SELL-LEASE
360/30 — 360/40 — 360/50 — 360/65

IBM PERIPHERALS

370/135	370/145	370/155	370/165
370/138	370/148	370/158	370/168

ANY CONFIGURATION

TW COMPUTER INDUSTRIES INC.
3570 American Drive • Atlanta, Georgia 30366
404/451-1895 • TWX 810/757-3654

CHICAGO — 312/295-2030
WASHINGTON — 202/466-2470
LOS ANGELES — 213/370-4844

For Sale or Lease

DISK PACKS

IBM-5440
IBM-2315
IBM-1316
IBM-2316
IBM-3336-1
IBM-3336-11

Data Automation Co. Inc.
4858 Cash Road
Dallas, TX 75247
(214) 637-6570

BUY OR SELL
COMPUTER/COMMUNICATION
EQUIPMENT

NEW IN-HOUSE
"DEAL COMPUTER"

• WE ACCEPT YOUR CONSIGNMENT INVENTORY —OR—
• WE WILL BUY YOUR INVENTORY OUTRIGHT • ALL LISTINGS ARE FREE!

GET COMPLETE DETAILS WITH A DIRECT CALL
800 327-3246 214 258-2414
TWX 910-960-5781 TELEX 72-0022

capital
equipment brokers
930 N. BELTLINE • IRVING, TEXAS 75061

DECWRITER II

\$1,495

Available at this price when purchased or leased with any of the Terminal Products listed below...

Techtran Datacassette from \$950
ADDS Video Display from \$1,595
Skys "Comm-Stor" from \$2,495
Floppy Disk File

All equipment is new and carries a full factory warranty.

TERMINAL MART

285 Madison Avenue
New York, N.Y. 10017
(212) 685-2679

WANTED

360/30

& peripherals

Donation of equipment requested by small independent college. We can use your older equipment to educate our students. You get the tax benefit of making a contribution.

Geneva College
Beaver Falls, Pa. 15010
Attn: Louis Martinage
Computer Dept.
(412) 846-5100 ext. 321

(1x7) 3420-6

TAPE SYSTEM

(1) 3525-P3

FOR SALE

Call Ed Joseph

IPS
IPS Computer Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs, N.J. 07632
(201) 871-4200

dataserv

Dataserv Equipment, Inc.
9901 Wayzata Blvd., P.O. Box 9488
Minneapolis MN 55440

CALCOMP

1030/230

3330-1 COMPAT

1035/235

3330-11 COMPAT

1040/340

3420-5, 7, Compat

Avail. Now...Dealers Welcome
DAVE MILLER

call toll free
800/328-2406
or 612/544-0335

MAGNETIC TAPE

FOR SALE!!

NEW MINIS

1600 BPI — 3200 FCI

1200' \$7.97
600' \$5.97
200' \$4.97

with hanging seal

Call Joan
(703) 339-7050

PMI
Precision Methods Inc.
8825 Telegraph Road
Lorton, Virginia 22079

dearborn

dearborn giveth NOW 2050-I (3-chan.); 2314/2319 (1x6); 2671/2822 paper tape.

dearborn giveth SOON 2314-A1 (1x4) avail. 3/15/77; 2314/2319 (1x6); 2821-5 control unit; 2540; two, 1403-N1's, all avail. 4/15/77.

dearborn taketh away your 3420's, 3803's, 3270's, all models. Contact Tom Millunchick... (312) 671-4410.



dearborn computer leasing company

hardware 360's/370's
systems software
brokerage

4849 n. scott st., schiller park, IL 60176 chicago (312) 671-4410
toronto (416) 621-7060 • st. louis • houston • detroit • los angeles

REQUEST FOR BIDS

SALE OF

Model Features	Description	Serial Number
2050 - 1	Central Processing Unit (524,288 Bytes Core)	11416
- 6980	First Selector Channel	
- 6981	Second Selector Channel	
- 6982	Third Selector Channel	
- 7920	1052 Adapter	
1052-7	Printer Keyboard Console	52239

Equipment IBM Maintained. Equipment Available: March 15, 1977. Bids Due: Monday, February 28, 1977 2:00 P.M.

Requests for RFB and questions should be directed to:

B.J. Carlson, Computer Services
Waubensee Community College
Route 47 at Harter Road Sugar Grove, IL 60554
(312) 466-4811

CONTACT CSI

**BUY
SELL
LEASE
TRADE**
Computer Equipment

Al Smith
6111 1960 West, Suite 202
Houston, Texas 77069
713-444-0246

Ken Steinback
11 S. Meramec, Suite 1304
Clayton, Mo. 63105
314-727-7010

Bryan G. Graham
8116 Cherington Drive
Indianapolis, Ind 46227
317-881-6766

Mike Jetland
23 Altarinda Drive, Suite B
Orinda, California 94563
415-254-3515

Bill Roselius
901 Office Park Plaza
Oklahoma City, Okla. 73105
405-840-1911

CSI
COMPUTER SALES INTERNATIONAL, INC.
Member: Computer Dealers Association



ITEL WANTS TO

BUY: 370/158

SELL: 360/50I, 40H, 40G, 30F, 30E
½ 360/65 MP
135 IBM Memory (96K-192K)
Itel 2314 Dual Density Disk Drives
2841's, 2314-A1's
2401's — all models

CONTACT: Linda Vaughn or Reenie McCarthy
Itel Computer Products Division
One Embarcadero Center
San Francisco, California 94111
(415) 983-0220, (415) 983-0238

Elspath Arden
Itel International
London, England
(441) 235-2495

ITEL
CORPORATION

3158
AVAILABLE
MARCH, 1977
SALE OR LEASE

3155-II DAT
SALE OR LEASE
MARCH, 1977

WANTED TO BUY
3158

TNCC

THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle — (312) 944-1401
600 North McClurg Court - Suite 4202A
Chicago, Illinois 60611

Paul Nortman — (516) 752-1000
1 Huntington Quadrangle - Suite 4S13
Huntington Station, New York 11746

buy sell swap

buy sell swap

buy sell swap

buy sell swap

buy sell swap

370/138's AND 148's AN IBM MLC ALTERNATIVE

ANICO COMPUTER LEASING, INC. now offers the true 48 month lease alternative to IBM MLC.

Early terminations and upgrade flexibilities. Delivery positions available or will take your order position.

Our rate 80% of MLC

Excellent alternatives on most 370 equipment from IBM 370/135 and up, especially 370/158, any model.

Most Competitive Financial Leasing on:

IBM Series/1

ITEL Advanced Systems

AMDAHL 470 Versions

CONTACT: Amado E. Hernandez, President

ANICO COMPUTER LEASING, INC.
a wholly owned Subsidiary of Analysis International Co., Inc.

4530 PARK ROAD CHARLOTTE, N.C. 28209

704/523-6912

MEMBER COMPUTER LESSORS ASSOCIATION

WANTED TO BUY

XEROX

J/SERIES LOGIC
NEW OR USED

Contact: Steve Lewis
(812) 337-9365

FOR SALE

360/65 J

SN 60347

2860-3, 2870-1

ALL IBM MEMORY.
We will also LEASE
for 36 Month period.

Call or write
Roger J. Foti
or Bob Hogan



I.O.A. Data Corp.
383 Lafayette St., N.Y. 10003
(212) 673-9300
Member Computer Dealers Assoc.

GO GREYHOUND



WHEN BUYING OR SELLING COMPUTER EQUIPMENT

FOR SALE

Available Now
2-3330-1's
2803-2 & 2420-7's

Available Jan.
370/155J With
AMS Memory & PSU

U.S.	Home Office New York Chicago Dallas San Francisco	T.A. Takash Dick Ventola Pete Ahern M.W. "Bill" Tucker Henry Paulson	(602) 248-6037 (914) 949-1515 (312) 298-3910 (214) 233-1818 (415) 283-8980
Canada	Don Maunders (Toronto)		(416) 366-1513
U.K.	Bruce Pearson (London)		(01) 759-9191
Europe	Joe Gold (Geneva)		(022) 61-27-54
Mexico	Andres Contreras		(905) 543-6850
Austro-Asia	Don Haworth		(214) 233-1818
Non-IBM	Dallas	John Hallmark	(214) 233-1818

Greyhound Computer Corporation Greyhound Tower Phoenix, Arizona 85077

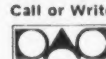
FOR SALE OR LEASE - 360/20

2020	DO2	Central Processor	30692
	7495	Storage Control	
	8082	2203 Attachment	
	8099	2560 Attachment	
2203	A01	350 LPM Printer	20090
	5558	24 Additional Print Positions	
	1903	52 Additional Print Positions	
2560	A01	M F C M	10437
2311	011	Disk Drives	17785
2311	011	Disk Drives	30383

Located: Portland, Oregon

Available: January 10, 1977

Maintenance Qualification: IBM Qualified



Call or Write:
Data Automation Co., Inc., P.O. Box 47922
Dallas, Texas 75247 - Phone (214) 637-6570
We would like to be your Computer Company.

BUYING

SELECT USED EQUIPMENT
FRIDEN • I.B.M. • LITTON • PHILIPS • OLIVETTI
N.C.R. 31, 32, & 41, 42, 43, 450's & 480's Bank Equip.
735/736 MAGNETIC TAPE ENCODERS & LINE PRINTERS
299 and 399 Minicomputers and Centurys
BURROUGHS F-5000/6000/9000 SERIES & "L" 2000 THRU 8000 SERIES & TC's
(W/WO PERIPHERALS) also 8-700 SYSTEMS THRU 8-4700
N.C.R. Authorized Dealer of
210 Electronic Cash Register, Adding Machines, Calculators
BUYING OR SELLING — CALL US FIRST!
KEY-EXIMPORT CORP.
256 LIVINGSTON ST. (P.O. BOX 129) NORTHVALE, N.J. 07847
TELE. N.J. (201) 767-3444
TELEX: 135149 CABLE: KEYEXIMP-NORTHVALE NJ

SELLING

**DATA GENERAL
NOVA 800
BUSINESS COMPUTER**

800 NANOSECOND CPU
32K Bytes Core Memory
3 Hazeltine 2000 video tubes
1 ASR 33 Teletype
1 Mohawk 600 lpm Printer
10 million bytes disk storage
2 full size Mag tape transports
800 BPI 9 track
Mounted in convenient cabinets
and Desk. Fully refurbished and
certified as maintainable. Fully
compatible with RDOS and Data
General software.
Our Price \$50,000 List \$89,990
(312) 678-3450 Ask for Glen

145-12

S/N 11400

Sale or Lease
Available February 1
With ISC

Call Rick Thiele



IPS Computer
Marketing Corp.
467 Sylvan Ave.
Englewood Cliffs,
N.J. 07632
(201) 871-4200

FOR SALE
IBM UNIT
RECORD
EQUIPMENT

024	\$175
026	\$750
047	\$850
056	\$50
059	\$1,650
077	\$100
082	\$650
083	\$1,650
084	\$2,250
084 Alpha	\$3,250
085	\$475
088-2	\$1,700
088-1	\$2,475
108	\$990
402	\$300
403	\$500
514	\$250
519	\$750
526	\$900
548	\$1,650
552	\$1,000
557	\$2,250



Data Automation Co. Inc.
4858 Cash Road
Dallas, TX 75247
(214) 637-6570



Realize the value of
your retired or surplus
1600 bpi computer
tapes. Sell them to me.
Any quantity. Call Mr.
Bob Brannigan, (312)
658-7030

FOR SALE
Honeywell H-3200
& Datanet 2000

For Information Contact:
Jay. K. Scott

**Transamerica
Computer Company**



Box 7994
San Francisco, Ca 94120
Telex: 34-0135
(TA Computer SFO)
(415) 983-5033

A Business Service of
Transamerica Corporation

360 CPU'S FOR SALE

360/30 128K 2 Channel S/N 18463
360/30 64K 2 Channel S/N 18177
360/40 256K 2 Channel S/N 22794
360/50 512K 3 Channel S/N 11031

CALL DICK BAKER (305) 561-5207

**dataware
incorporated**

Intracoastal Building
3000 NE 30th Place, Suite 309
Fort Lauderdale, Florida 33306
Telephone (305) 561-5207



MEMBER
CDA

Now Randolph has 2 hot lines!

The S/370 hot line.
800-243-5307

The S/360 hot line.
800-243-5308

WE WANT TO BUY

- ☐ 138/148 on-order positions
- ☐ 135/145 subleases

RANDOLPH COMPUTER COMPANY

WE WANT TO BUY

- ☐ 3420-3's
- ☐ 3420-5's

537 Steamboat Road - Greenwich, Connecticut 06830

buy sell swap	buy sell swap	buy sell swap	buy sell swap	buy sell swap												
<p>BUY SELL LEASE</p> <p>Peripherals & I/O</p> <table border="0"> <tr> <td>3330's</td> <td>3410's</td> <td>3211's</td> </tr> <tr> <td>3340's</td> <td>3420's</td> <td>3505's</td> </tr> <tr> <td>3350's</td> <td>2401's</td> <td>1403's</td> </tr> <tr> <td>2314's</td> <td></td> <td>2501's</td> </tr> </table> <p>Gene Chappell CIS CIS Corp. 600 Mony Plaza Syracuse NY 13202 (315) 425-1900 Telex: 93-7435</p>	3330's	3410's	3211's	3340's	3420's	3505's	3350's	2401's	1403's	2314's		2501's	<p>CMI BUY LINES</p> <div> <p>370 115-125-135 Buy-Sell-Lease-Trade Call Mike Vargo (313) 774-9500</p> <hr/> <p>Systems Components Features 360/20 Call Bob Southwell (313) 774-9500</p> <hr/> <p>S/3 Components & Systems Call Jerry Roberts (313) 774-9500</p> <hr/> <p>1130 Call Jim Carleton (313) 774-9500</p> </div> <div> <p>370/138-148-158 Delivery Position Information Call Bill Graham (313) 774-9500</p> <hr/> <p>360/50 360/40 360/30 We Buy and Sell Any 360 System or Peripherals. Before you buy or sell, get your most competitive offer from CMI. Call Bob Van Hellemont (313) 774-9500</p> <hr/> <p>3420's 3803's 3333's 3830's 3330's 3340's SALE OR LEASE ALL MODELS Call Darryl Hastings (313) 774-9500</p> </div> <div> <p>370/145-155-158 BUY-SELL-LEASE Call Ron Baker (313) 774-9500</p> <hr/> <p>IBM 129 Users We Want to Buy Rental Credit Machines Lease Back Plans Available BUY-SELL-LEASE 129 029 059 026 IBM Manufactured 082 083 514 Call Jim Carleton (313) 774-9500</p> <hr/> <p>IN CANADA IBM 360 370 System/3 Buy-Sell-Lease Call Don DuPuis CMI Company P.O. Box 893 Windsor, Ont. N9A6P2 (519) 258-8910</p> </div>			<p>MINI LEASES</p> <p>1,000 to 20,000 Quick Service Prompt Payment Nationwide</p> <p>First Data Lease & Assoc. Suite 200 15236 Burbank Blvd. Van Nuys, Calif. 91401 (213) 787-8560</p>
3330's	3410's	3211's														
3340's	3420's	3505's														
3350's	2401's	1403's														
2314's		2501's														
<p>WANTED SECURE STORAGE SPACE FOR MAGNETIC TAPES</p> <p>Various Metropolitan Areas around the U.S.</p> <p>Write CW Box 4893 797 Washington St. Newton, Mass. 02160</p>	<p>WANTED TO PURCHASE Service Bureau Located in Chicagoland Please reply with sales volume, number of accounts, type of hardware utilized, number of employees etc. CW Box 4897 797 Washington St. Newton, Mass. 02160</p>			<p>FORSYTH McARTHUR ASSOCIATES INC</p> <p>IBM Computer Dealer & Lessor</p> <p>919 North Michigan Avenue, Chicago, Illinois 60611 312-943-3770 Telex 255161 Member, Computer Dealers Association</p>												
<p>BUY-SELL TRADE For Computer Call Action Write</p> <p>CAC 404/458-4425 P.O. Box 80572 Atlanta, Ga. 30366</p>	<p>CMI Computer Marketers International 23000 Mack Ave., St. Clair Shores, Mi. 48080 313/774-9500</p> <p>THE IBM DEALER</p> <p>Member Computer Dealers' Association</p>															

ARE YOU INTERESTED IN EXCHANGING
YOUR 370/138 OR 370/148 ON-ORDER
POSITION FOR

\$\$\$DOLLARS\$\$\$

OR PERHAPS SELLING YOUR POSITION?

PCM HAS DELIVERY POSITIONS ON
370/138's AND 370/148's STARTING
MAY 13 THROUGH DECEMBER 30, 1977.

CALL RALPH GRAVES 214/630-6700



Pioneer Computer Marketing
1165 Empire Central Place
Suite 232
Dallas, Texas 75247

MINICOMPUTERS

Don't waste company money.
Check with us before you buy or
sell.
DEC, DGC, Most Others' systems
and peripherals.
DEC - COS 340/save 25%. PDP
11/10 with floppy discs/save 25%.
PDP 11, PDP 8, DEC peripherals.
DGC - NOVA 800 Timeshare
System/save 50%. Tape systems/
from \$3900. RJE Terminals.
Nova 2, Nova 3, Eclipse.

WANTED

Minicomputer systems and pe-
ripherals. Buyers waiting for
many items:

DEC RK 05
PDP 8E, 11/05

**MINICOMPUTER
EXCHANGE**

(408) 733-4400
TWX 910-339-9272

ENTREPRENEURS

COMPUTER SHACK

Personal computers are the world's newest, most exciting and the
fastest-growing business. Computer Shack, our turn-key computer
franchise network, lets you get in at the ground floor. Unlimited
potential. Complete training program.

Personal microcomputers are sold to business, science, education, the
professions, as well as the explosively growing hobbyist market.
Computer Shacks offer microcomputers, modules, tools, books, acces-
sories; provide equipment assembly and testing. Each store has a
traffic-building Game Room. Choice locations available.

Call or write:
Ed Faber, President

Computer Shack, Inc.
14860 Wicks Blvd.
San Leandro, CA 94577
(415) 895-9363

FOR IMMEDIATE SALE

Digital Equipment

8 RP03 Disk Drives

W/CONTROLLER

Excellent Condition-One Year Old
Attractive Purchase Price
Under DEC Maintenance Contract
Disk Packs Included

CONTACT: MR. DONALD LO CICERO
(809) 722-0054
(809) 722-0068

**THE UNITED CREDIT BUREAU
OF PUERTO RICO**

804 PONCE DE LEON SANTURCE P.R. 00907

BUY - SELL - LEASE -BROKERAGE-

Let the
"Nation's Largest Wholesale Dealer"
Buy, sell, lease sub-lease, or be
your agent in placement of your
pre-owned IBM 360/370/System
3, or other units.
COMPUTER INTERNAT'L LTD.
BEACH COMPUTER CORP.
CWC's Leasing Division
COMPUTER WHOLESALE CORP.
(504) 581-7741

Suite 507/508 First National
Bank of Commerce Bldg.
New Orleans, LA 70112
Member Computer Dealers Assoc.

FOR SALE

PDP-11/45

224KB-F.P.P.
2 RP03's
2 DH11's
1 TU10
1 LP02

UNDER CONTINUOUS
DEC MAINTENANCE
CALL

FLORIDA COMPUTER, INC.
(305) 652-1710

370/138 & 370/148

54% OF IBM MAC

On an 84 Month Net Lease
Next available machines ship in APRIL
Call Ed Joseph (138) or Rick Thiele (148)

IPS

IPS Computer Marketing Corp.
467 Sylvan Avenue
Englewood Cliffs, N.J. 07632
(201) 871-4200

LOOK!

WANT TO PURCHASE
370/360 Peripheral Equipment
3330-3340-3803-3420-1403N1
Will Consider Your Purchase Options
We Are the Texas Good Guys With
the White Hats



DATA AUTOMATION COMPANY, INC.
4858 Cash Road, Dallas, TX 75247
(214) 637-6570



buy sell swap	buy sell swap	buy sell swap	buy sell swap	time & services																																																																																										
The Logical Choice SELLING LEASING BUYING Comdirco 3155-102 - Mar. - 3145102 - Mar. 3165K02 - Apr. - 3158K - Apr. 3145H02 - Mar. - 18 month lease 3155K02 - Apr. - 42 month lease 2065-1 - Apr. - 36 month lease 3148-K - May - 60 month lease 370/145's 370/158's 370/168's 3330 3420 3340 9701 W. HIGGINS RD. ROSEMONT, ILL. 60018 (312) 698-3000		IBM UNIT RECORD EQUIPMENT <table border="1"> <thead> <tr> <th>MACH.</th> <th>SALE</th> <th>LEASE</th> <th>MACH.</th> <th>SALE</th> <th>LEASE</th> <th>MACH.</th> <th>SALE</th> <th>LEASE</th> </tr> </thead> <tbody> <tr> <td>024</td> <td>\$250</td> <td>\$17/Mo.</td> <td>082</td> <td>\$850</td> <td>\$35/Mo.</td> <td>514</td> <td>\$600</td> <td>\$45/Mo.</td> </tr> <tr> <td>026</td> <td>\$800</td> <td>\$30/Mo.</td> <td>083</td> <td>\$1850</td> <td>\$60/Mo.</td> <td>519</td> <td>\$900</td> <td>\$55/Mo.</td> </tr> <tr> <td>029</td> <td>\$1900</td> <td>\$50/Mo.</td> <td>084</td> <td>\$2300</td> <td>\$100/Mo.</td> <td>526</td> <td>\$1400</td> <td>\$70/Mo.</td> </tr> <tr> <td>046</td> <td>\$1200</td> <td>\$50/Mo.</td> <td>085</td> <td>\$1100</td> <td>\$60/Mo.</td> <td>548</td> <td>\$1600</td> <td>\$70/Mo.</td> </tr> <tr> <td>047</td> <td>\$1500</td> <td>\$60/Mo.</td> <td>088</td> <td>\$2500</td> <td>\$175/Mo.</td> <td>552</td> <td>\$1000</td> <td>\$40/Mo.</td> </tr> <tr> <td>056</td> <td>\$175</td> <td>\$15/Mo.</td> <td>089</td> <td>\$1300</td> <td>\$50/Mo.</td> <td>557</td> <td>\$3000</td> <td>\$100/Mo.</td> </tr> <tr> <td>059</td> <td>\$1800</td> <td>\$50/Mo.</td> <td>402</td> <td>\$800</td> <td>\$60/Mo.</td> <td>602</td> <td>\$300</td> <td>\$20/Mo.</td> </tr> <tr> <td>063</td> <td>\$750</td> <td>\$30/Mo.</td> <td>403</td> <td>\$900</td> <td>\$70/Mo.</td> <td>2311</td> <td>\$450</td> <td>\$30/Mo.</td> </tr> <tr> <td>077</td> <td>\$350</td> <td>\$25/Mo.</td> <td>407</td> <td>\$1200</td> <td>\$80/Mo.</td> <td>1401</td> <td>\$10500</td> <td>\$400/Mo.</td> </tr> </tbody> </table> THOMAS COMPUTER CORPORATION 600 N. McClurg Court - Suite 4202 Chicago, Illinois 60611 (312) 944-1401		MACH.	SALE	LEASE	MACH.	SALE	LEASE	MACH.	SALE	LEASE	024	\$250	\$17/Mo.	082	\$850	\$35/Mo.	514	\$600	\$45/Mo.	026	\$800	\$30/Mo.	083	\$1850	\$60/Mo.	519	\$900	\$55/Mo.	029	\$1900	\$50/Mo.	084	\$2300	\$100/Mo.	526	\$1400	\$70/Mo.	046	\$1200	\$50/Mo.	085	\$1100	\$60/Mo.	548	\$1600	\$70/Mo.	047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	552	\$1000	\$40/Mo.	056	\$175	\$15/Mo.	089	\$1300	\$50/Mo.	557	\$3000	\$100/Mo.	059	\$1800	\$50/Mo.	402	\$800	\$60/Mo.	602	\$300	\$20/Mo.	063	\$750	\$30/Mo.	403	\$900	\$70/Mo.	2311	\$450	\$30/Mo.	077	\$350	\$25/Mo.	407	\$1200	\$80/Mo.	1401	\$10500	\$400/Mo.	Datacenter 370/158 3 meg VS2 Specializing in Remote Job Entry and Batch Excellent Technical Support Very Attractive Rates Contact: Stu Kerievsky (212) 564-3030 Datamor 132 W. 31st St. New York, N.Y. 10001
MACH.	SALE	LEASE	MACH.	SALE	LEASE	MACH.	SALE	LEASE																																																																																						
024	\$250	\$17/Mo.	082	\$850	\$35/Mo.	514	\$600	\$45/Mo.																																																																																						
026	\$800	\$30/Mo.	083	\$1850	\$60/Mo.	519	\$900	\$55/Mo.																																																																																						
029	\$1900	\$50/Mo.	084	\$2300	\$100/Mo.	526	\$1400	\$70/Mo.																																																																																						
046	\$1200	\$50/Mo.	085	\$1100	\$60/Mo.	548	\$1600	\$70/Mo.																																																																																						
047	\$1500	\$60/Mo.	088	\$2500	\$175/Mo.	552	\$1000	\$40/Mo.																																																																																						
056	\$175	\$15/Mo.	089	\$1300	\$50/Mo.	557	\$3000	\$100/Mo.																																																																																						
059	\$1800	\$50/Mo.	402	\$800	\$60/Mo.	602	\$300	\$20/Mo.																																																																																						
063	\$750	\$30/Mo.	403	\$900	\$70/Mo.	2311	\$450	\$30/Mo.																																																																																						
077	\$350	\$25/Mo.	407	\$1200	\$80/Mo.	1401	\$10500	\$400/Mo.																																																																																						
1130 Components for Sale 600 LPM Printer Disc Controller 16K Fast Memory Write or call Larry Mahoney R.W. Beck & Assoc. 200 Tower Bldg. Seattle, WA 98101 (206) 622-5000		155 II S/N 10463 Sale or Lease Available for Immediate Delivery With or Without Memory Call Ted Molinari IPS IPS Computer Marketing Corp. 467 Sylvan Ave. Englewood Cliffs, N.J. 07632 (201) 871-4200	WANTED BURROUGHS L3000, L5000, L8000 TC700, TC 3500 NCR 31-32-41-42-43-152 IBM 360, 370 System 3 & 32 DEC PDP 8's and 11 CPU's IOA I.O.A. Data Corp. 383 Lafayette St., N.Y. 10003 (212) 673-9300 Member Computer Dealers Assoc.	Prime Time Available 360/50 - 256K 5/2314 - 4/180KB Call: (212) 725-5775 Infologic 444 Park Ave. So. (30St) New York 10016																																																																																										
IBM EQUIPMENT FOR LEASE <table border="1"> <tbody> <tr><td>024</td><td>\$10/Month</td></tr> <tr><td>026</td><td>\$30/Month</td></tr> <tr><td>077</td><td>\$15/Month</td></tr> <tr><td>082</td><td>\$25/Month</td></tr> <tr><td>083</td><td>\$55/Month</td></tr> <tr><td>088-1</td><td>\$150/Month</td></tr> <tr><td>088-2</td><td>\$100/Month</td></tr> <tr><td>402</td><td>\$25/Month</td></tr> <tr><td>403</td><td>\$30/Month</td></tr> <tr><td>407</td><td>\$40/Month</td></tr> <tr><td>419</td><td>\$25/Month</td></tr> <tr><td>514</td><td>\$35/Month</td></tr> <tr><td>519</td><td>\$50/Month</td></tr> <tr><td>526</td><td>\$60/Month</td></tr> <tr><td>548</td><td>\$75/Month</td></tr> <tr><td>552</td><td>\$45/Month</td></tr> <tr><td>557</td><td>\$100/Month</td></tr> </tbody> </table> 1401-CO6 System Complete with Tapes & Disks \$1,000/Month. 7330 Tape Drives \$25/Month DAC Data Automation Co., Inc. 4858 Cash Road Dallas, TX 75247 (214) 637-6570		024	\$10/Month	026	\$30/Month	077	\$15/Month	082	\$25/Month	083	\$55/Month	088-1	\$150/Month	088-2	\$100/Month	402	\$25/Month	403	\$30/Month	407	\$40/Month	419	\$25/Month	514	\$35/Month	519	\$50/Month	526	\$60/Month	548	\$75/Month	552	\$45/Month	557	\$100/Month	SYSTEM/3 1130 360/20 BUY • SELL • LEASE For a prompt, competitive quotation on your IBM needs, call or write today. "The Small Systems Specialists" ECONOCOM ECONOMIC COMPUTER SALES, INC. 1256 Lynnfield Road P.O. Box 17825 Memphis, Tenn. 38117 (901) 767-9130 TWX 810-591-1205 Member Computer Dealers Association		I.B.M. 360-40 All Shifts 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility. From \$35/Hour Restaurant Associates, Inc. 1540 Broadway New York, N.Y. 10036 Contact: Al Palmo (212) 974-4966 Charles Leigey (212) 974-4967																																																								
024	\$10/Month																																																																																													
026	\$30/Month																																																																																													
077	\$15/Month																																																																																													
082	\$25/Month																																																																																													
083	\$55/Month																																																																																													
088-1	\$150/Month																																																																																													
088-2	\$100/Month																																																																																													
402	\$25/Month																																																																																													
403	\$30/Month																																																																																													
407	\$40/Month																																																																																													
419	\$25/Month																																																																																													
514	\$35/Month																																																																																													
519	\$50/Month																																																																																													
526	\$60/Month																																																																																													
548	\$75/Month																																																																																													
552	\$45/Month																																																																																													
557	\$100/Month																																																																																													
WANTED 3420's 3803's 3333's 3830's 3330's PCM will purchase your installed disk's or tapes that have maximum rental credits 214/630-6700 PCM Pioneer Computer Marketing 1165 Empire Central Place Dallas, Texas 75247		WANTED TO BUY 2860-2 SELECTOR CHANNEL A.M.G. EQUIPMENT SERVICES INC. 99 Wall Street New York 10005 (212) 767-0670 Contact Ted Moulder (800) 221-2674		COMPUTER TIME AVAILABLE 370/145 512K OS/VS1 3-1403 N1 Printers QN,SN,TN Printer Trains 8-1600 bpi, 2-800/1600 bpi Tape Drives 4-3330 Disk Drives Attractive Rates Up to 48 hrs/wk INFORMATION SERVICES, INC. Babson Park, MA 02157 Contact: Ken Brown (617) 237-4000																																																																																										
CONFIDENTIAL BOX SERVICE FOR ADVERTISERS who do not wish their names or addresses to appear in their ads, Computerworld offers a confidential box service. To take advantage of this service, simply state in your initial order that you would like a "blind" ad. Computerworld will then assign your ad a box number and forward all replies. The cost for this extra service is only \$1 per ad per insertion, no matter how many replies are received.		TO BUY OR TRADE July '77 Delivery position on IBM 370/138 Model I Contact Leroy Francis (601) 693-3421 TO SELL OR TRADE October '77 Delivery position on IBM 370/148 Model K	FOR SALE OR LEASE 360/40 H 360/50 H Corporate Computers, Inc. 115 Mason Street Greenwich, Conn. 06830 (203) 661-1500	WE ARE BROKERS OF COMPUTER TIME New York & New Jersey Only COMPUTER RESERVES, INC. (212) 687-1840 (201) 676-1881 DATA BINDERS \$1.75 EACH 14 7/8 x 11 Pressboard All Other Sizes Available \$35 Minimum CENTURY (201) 461-2575																																																																																										
dataserv buy • sell • lease • trade <table border="1"> <thead> <tr> <th>360</th> <th>370</th> <th>System/3</th> <th>Peripherals</th> </tr> </thead> <tbody> <tr> <td>360/30</td> <td>370/115</td> <td>5410</td> <td>Disks</td> </tr> <tr> <td>360/40</td> <td>370/125</td> <td>5415</td> <td>Tapes</td> </tr> <tr> <td>360/50</td> <td>370/135</td> <td>Sys/32</td> <td>Printers</td> </tr> <tr> <td>360/65</td> <td>370/145 +</td> <td>Peripherals</td> <td>Card I/O</td> </tr> </tbody> </table> Call our "quotation hot-line" Toll free 800/328-2406 / or 612/544-0335 Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd., P.O. Box 9488, Minneapolis MN 55440		360	370	System/3	Peripherals	360/30	370/115	5410	Disks	360/40	370/125	5415	Tapes	360/50	370/135	Sys/32	Printers	360/65	370/145 +	Peripherals	Card I/O	TIME & SERVICES Thomas National, Inc. 1775 Broadway, N.Y.C. 370/158 TIME SALES All Major Systems Supported High Speed Low Speed RJE Convenient 57th St. Location Open 24 Hours Everyday Call (212) 765-8500		DATA SERVICES and TIME AVAILABLE IBM 360/30 - 64K 2540 - 1403N1 5-9 Track-800 BPI 6-2314 4-2311 LOCATED IN CAMBRIDGE MASS. On (Red Line) Public Transportation For More Information Call (617) 491-0649 Computer Time Available IBM 370/145 (13) 2314 Disk Drives Reasonable hourly rates or long-term contracts Convenient Michigan Location Write: D.P. Director P.O. Box 1406 Ann Arbor, MI 48106 Or call (313) 769-6522, Ext. 258																																																																						
360	370	System/3	Peripherals																																																																																											
360/30	370/115	5410	Disks																																																																																											
360/40	370/125	5415	Tapes																																																																																											
360/50	370/135	Sys/32	Printers																																																																																											
360/65	370/145 +	Peripherals	Card I/O																																																																																											

time & services

CONTRACT PROGRAMMING SERVICES

Systems Analyst/Programmer experienced in the design, coding, testing, implementation and documentation of business computer systems, available to provide programming services on a contract basis.

For more information, write:

Bruce Hartwig
COBE CORP.
P.O. Box 824
Madison, Wisc. 53701
or call:
(608) 238-4191

SOFTWARE FOR SALE

System/3

General Ledger

- Financial data base
- Any chart of accounts
- Report Writer
- Allocations

Get MORE from your System/3

SOFTWARE®
INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

® Registered trademark of Software International Corp.

TONE II

THE ONLY COMPLETE
TIME SHARING SYSTEM
FOR VSI

(CHECK THESE POINTS)

- EDIT WITH FULL SCREEN CAPABILITY
- INTERNAL READER JOB SUBMIT
- OUTPUT RETRIEVAL WITH REMOTE SUPPORT
- SYSTEM MAINTENANCE
- PROGRAM DEVELOPMENT
- DATA ENTRY
- SYSTEM DEBUGGING
- TEXT EDITING
- PERFORMANCE MONITORING SUPPORT
- USER COMMAND INTERFACE
- INTERACTIVE PROGRAM EXECUTION
- OPERATIONS ADDITIONAL CONSOLE SUPPORT
- DATASET MAINTENANCE
- CATALOG MANAGEMENT
- ISP SUPPORT
- REMOTE ENTRY SUBSYSTEM SUPPORT
- ENHANCED 3270 USABILITY
- FULL ASCII TERMINAL SUPPORT
- INTERACTIVE COMPUTING
- DATA INQUIRY

WRITE FOR DETAILS

TONE
Software Corp.
1158 TRADE AVENUE
GARDEN GROVE, CA 92643
(714) 636-8502

To meet (or beat) deadlines,
to handle user requests,
to stay within budget, use

PC-70

The automated system that helps you manage people and projects effectively, PC-70 is applicable to virtually any type of project or project-oriented group, including DP, engineering, R&D, legal, facilities planning, maintenance, and construction. Simple, powerful and economical, PC-70 is today's leading project/resource management system, with over 300 clients worldwide.



Atlantic Software Inc.

5th & Chestnut Sts.
Philadelphia, PA 19106 / (215) 922-7500
Europe: Tecsi Software, Paris / 225-86-83

software for sale

BANK SYSTEMS
Central Information
Financial Control System
Mortgage Loan
Time Certificates of Deposit
Commercial Loan
Demand Deposit
Installment Loan
Savings

COMDAR CORPORATION

247 Washington Street
Wellesley Hills, Mass. 02181
(617) 237-5585
Offices: Boston/Los Angeles

-CIMS-

Job accounting & system performance reporting product for IBM 370/360 computer users. CIMS supports all current releases and variations of DOS, DOS/VS, POWER/VS, OS/VS1, VS2, MVS, MFT, MVT, etc. The CIMS product is the only job accounting system to receive an award from Datapro for program excellence. To order a demonstration of CIMS without obligation, contact:

BMS Computer Inc.
P.O. Box 3086
Walnut Creek, CA 94598
(415) 938-2620

PAYROLL PERSONNEL
SUPER/PAY
ONLY \$960
ANS COBOL
60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase

Easy to Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNION MAILING, ETC

Extensive Documentation Provided

Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

To build cost-justified information systems that satisfy user requirements, use

SDM-70

The practical, top-down approach to creating information systems, SDM-70 provides a complete set of guidelines (planning, estimating, methods, and documentation) to perform the entire systems life-cycle process... simply and effectively. Best of all, SDM-70 costs \$1,000's less than other alternatives.



Atlantic Software Inc.

5th & Chestnut Sts.,
Philadelphia, PA 19106
(215) 922-7500

software for sale

InSci
Information Science Incorporated
Others may claim conversion, training and installation, but we really do it.
EEO
Every company with 1,000 employees or more should look at this system.

InSci Headquarters 95 Chestnut Ridge Road, Montvale NJ 07645

SAVE WASTED DISK...

VSERV, a VTOC Service Utility, solves disk management problems of identifying wasted disk space under DOS and DOS/VS. VSERV provides graphic mapping facilities and VTOC access capabilities. Powerful VTOC manipulation commands are supplied to graphically DISPLAY a VTOC, CREATE, DELETE, UPDATE, RENAME, or TRUNCATE one or more files. VSERV allows instant identification of free space, under-blocked and over-allocated files.

User tailored default and security options provide against unauthorized use of the VTOC manipulation commands. A complete audit trail for historical use is provided.

VSERV provides all of these capabilities for a one time purchase of \$400. Join over 30 satisfied users on all types of direct access devices. Order VSERV today on a 30 day trial.
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

Personnel Management and Reporting

MSA'S Personnel Management and Reporting System keeps records on more people than live in Atlanta, San Diego, Boston and Los Angeles combined.

If you'd like to find out how this system can help you keep comprehensive personnel data in compliance with Federal Governmental EEO, ERISA and OSHA requirements, call Marge Kimbrough at (404) 262-2376 or send us this coupon.

MSA
THE FINANCIAL SOFTWARE COMPANY

Management Science America, Inc.
3445 Peachtree Road, N.E.
Suite 1300
Atlanta, Georgia 30326
(404) 262-2376

Chicago 312-986-2450;
Los Angeles 213-822-9766;
New York 201-871-4700

NAME _____
COMPANY _____
TITLE _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
PHONE _____ COMPUTER MODEL _____

- I am interested in:
- ☐ Personnel Management and Reporting
 - ☐ General Ledger
 - ☐ ALITAX™
 - ☐ Accounts Payable
 - ☐ Accounts Receivable
 - ☐ Financial Information and Control
 - ☐ Fixed Asset/Property Accounting
 - ☐ Supplies Inventory Control and Purchasing

software for sale



Move up to

ACCOUNTING IV

General Ledger and Financial Reporting

Accounts Payable

Accounts Receivable

Three fully integrated financial application systems, proved during years of successful use. Totally ANS COBOL. Call or write today for details.

informatics inc.

World's Largest In Software Products

65 Route 4, River Edge, NJ 07661

New York: (212) 564-1258
New Jersey: (201) 488-2100
Chicago: (312) 325-5960
Los Angeles: (213) 887-9040
Massachusetts: (617) 481-1180
Philadelphia: (215) 265-7448
Sacramento: (916) 961-1881
Stamford, CT: (203) 357-7924
Dallas: (214) 750-0800

MMS
Accounts Receivable
(Eliminates the Long Wait.

SOFTWARE®
INTERNATIONAL
Elm Square, Andover, MA 01810
(617) 475-5040
® Registered trademark of Software International Corporation

Whether you're buying, selling, swapping, hiring or looking, Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/ Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy.

Cost: Our rates are \$49.70 per column inch. Minimum size is two column inches and costs \$99.40 per insertion. Extra space is available in half-inch increments and costs \$24.85. Box numbers are \$1.00 extra.

Billing: If you're a first-time advertiser, we must have your payment in advance.

Ad Size: _____ Issue (Date(s)): _____ Section: _____

Signature _____

Name: _____

Company: _____ Title: _____

Address: _____ Tel: _____

Send this form to: Pam Palmer, Classified Advertising,
or Kathy Steinberg, Position Announcements

COMPUTERWORLD, 797 Washington St., Newton, Mass. 02160

software for sale

Q-PAC Payroll
Most Powerful System of All

- Comprehensive tax module
- Customized personnel processing
- Most flexible report writer
- Powerful general ledger interface

Other financial systems:

General Ledger
Accounts Payable
Accounts Receivable

SOFTWARE®
INTERNATIONAL
Elm Square, Andover, Mass. 01810
(617) 475-5040

® Registered trademark of Software International Corporation

InSci
Information Science Incorporated
Others may claim conversion, training and installation, but we really do it.
ERISA
Every company with 1,000 employees or more should look at this system.

InSci Headquarters 95 Chestnut Ridge Road, Montvale NJ 07645

SOFTWARE WANTED

WANTED:

8080 SOFTWARE

Microcomputer manufacturer wants to purchase DOS, Extended BASIC, RPG, FORTRAN IV, COBOL, APL, SORT/MERGE, DBMS and other system development software. Respond with specs, operational status, hardware required, preferred method of sale.

CW Box 4783
797 Washington St.
Newton, Mass. 02160

COMPUTERWORLD Computer Stocks Trading Indexes

— Computer Systems - - - - Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 Supplies & Accessories - - - - CW Composite Index



Earnings Reports

ADDRESSOGRAPH-MULTIGRAPH

Three Months Ended Oct. 31

	1976	a1975
Shr Ernd	\$0.04	\$0.06
Revenue	135,733,000	133,828,000
Earnings	6329,000	551,000

a-Restated. b-Includes gain of \$1.1 million from sale of surplus distribution center.

AT&T

Year Ended Nov. 30

	1976	a1975
Shr Ernd	\$6.05	\$5.08
Revenue	32,538,443	28,614,141
Earnings	3,813,371	3,104,814
3 Mo Shr	1.61	1.30
Revenue	8,432,376	7,503,907
Earnings	1,030,083	805,712

APPLIED MAGNETICS

Year Ended Sept. 30

	1976	1975
Shr Ernd	\$0.35	\$0.21
Revenue	63,133,627	62,338,878
Earnings	1,493,062	895,043
3 Mo Shr	.15	.09
Revenue	17,504,627	15,403,878
Earnings	651,062	393,043

CARTERPHONE COMMUNICATIONS

Year Ended Sept. 30

	1976	1975
Shr Ernd	\$0.34	\$0.31
Revenue	9,286,000	7,485,000
Spec Cred	17,000
Earnings	701,000	619,000

COMDISCO

Year Ended Sept. 30

	1976	1975
Shr Ernd	\$2.13	\$0.92
Revenue	84,032,633	47,400,607
Earnings	2,324,742	1,116,128
3 Mo Shr	.58	.32
Revenue	23,244,534	17,852,236
Earnings	591,294	395,475

DATA GENERAL

Three Months Ended Dec. 18

	1976	1975
Shr Ernd	\$0.56	\$0.37
Revenue	47,058,000	29,023,000
Earnings	5,333,000	3,501,000

Computerworld Sales Offices

National Sales Manager
 Roy Einreinhofer
 Advertising Administrator
 Judy Milford
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800
 Telex: USA-92-2529

Boston
 Robert Ziegel
 Northern Regional Manager
 Mike Burman
 Account Manager
 COMPUTERWORLD
 797 Washington Street
 Newton, Mass. 02160
 Phone: (617) 965-5800

New York
 Donald E. Fagan
 Eastern Regional Manager
 Frank Gallo
 Account Manager
 COMPUTERWORLD
 2125 Center Avenue
 Fort Lee, N.J. 07024
 Phone: (201) 461-2575

San Francisco
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Donna Dezellan
 Account Coordinator
 COMPUTERWORLD
 1212 Hearst Bldg.
 San Francisco, Calif. 94103
 Phone: (415) 495-0990

Los Angeles
 Bill Healey
 Western Regional Manager
 Jim Richardson
 Account Manager
 Chris Canary
 Account Coordinator
 1434 Westwood Boulevard
 Los Angeles, CA 90024
 (213) 475-8486

Japan:
 Mr. Shigema Takahashi
 General Manager
 Dempa/Computerworld
 1-11-15 Higashi Gotanda
 Shinagawa-ku, Tokyo 141
 Phone: (03) 445-6101
 Telex: Japan-26792
 United Kingdom:
 Roger R. Frampton
 Computerworld Publishing Ltd.
 140-146 Camden Street
 London NW1 9PF, England
 Phone: (01) 485-2248
 Telex: UK-26-47-37
 West Germany:
 Manfred Kufner
 Computerworld GmbH
 8000 Munich 40
 Tristramstrasse 11
 West Germany
 Phone: (089) 36-40-36
 Telex: W.Ger-5-215250-HK.FD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 2, 1977

All statistics compiled,
 computed and formatted by
 TRADE*QUOTES, INC.
 Cambridge, Mass. 02139

X C H		1976-77 RANGE (1)	PRICE		
			CLOSE FEB 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS					
O	AMCAHL CORP	23- 40	34 1/2	+1 3/4	+5.3
N	BURROUGHS CORP	74-108	74	- 3/8	-0.5
O	COMPUTER AUTOMATION	10-23	21 1/2	- 1/8	-0.5
N	CONTROL DATA CORP	18-27	23 7/8	-1 1/8	-4.5
N	DATA GENERAL CORP	40-60	42 1/8	+ 5/8	+1.5
O	DATAPoint CORP	24-46	23 1/2	- 3/4	-3.0
O	DIGITAL COMM CONTROL	2- 7	6 3/4	0	0.0
N	DIGITAL EQUIPMENT	45-60	46 3/8	+1 3/8	+3.0
N	ELECTRONIC ASSOC.	2- 5	2 3/4	- 1/4	-8.3
A	ELECTRONIC ENGINEER.	7- 16	8 7/8	- 1/2	-5.3
O	FOUR-PHASE SYSTEMS	13-21	15 5/8	- 5/8	-3.8
N	FOXBORO	28-51	44 1/2	- 3/8	-0.8
O	GENERAL AUTOMATION	4- 11	8 1/8	- 1/8	-1.5
O	GRI COMPUTER CORP	1- 1	1 1/2	+ 1/8	+33.3
N	HEWLETT-PACKARD CO	75-117	75	-4 1/4	-5.3
N	HONEYWELL INC	34- 56	46	+2	+4.5
N	IBM	227-288	274 1/4	+6	+2.2
O	MANAGEMENT ASSIST	1- 9	8 3/8	+ 3/4	+9.8
O	MEPCORX	17-33	24 3/4	- 5/8	-2.4
O	MICRDATA CORP	10-28	12 1/4	-2 3/8	-16.2
O	MODULAR COMPUTER SYS	3- 14	5 7/8	+ 1/8	+2.1
N	NCR	24-38	37 3/4	+3 3/4	+11.0
O	PRIME COMPUTER INC	4- 18	16 1/4	- 3/4	-4.4
N	PERKIN-ELMER	19-27	19 1/2	- 5/8	-3.1
N	RAYTHEON CO	45-67	58 1/4	+ 3/8	+0.6
N	SPERRY RAND	38-52	38 1/4	- 1/2	-1.2
O	SYCOR INC	9-31	12	- 5/8	-4.9
A	SYSTEMS ENG. LABS	5- 10	6 5/8	- 3/8	-5.3
N	VARIAN ASSOCIATES	12- 19	18 3/4	+1 7/8	+11.1
A	WANG LABS.	11-20	14 1/8	-1 1/8	-7.3
LEASING COMPANIES					
O	BOCTHE COMPUTER CORP	1- 9	10 1/4	+1 1/8	+12.3
O	COMDISCO INC	3- 12	11 1/2	+2	+21.0
A	COMMERCE GROUP CORP	2- 3	2 1/8	0	0.0
A	COMPUTER INSTRS GRP	1- 3	1 7/8	0	0.0
M	DATACON RENTAL	1- 8	1 1/2	- 1/4	-14.2
A	DCL INC	1- 2	1 7/8	+7/8	+87.5
N	DPF INC	5- 8	7 1/2	- 1/4	-3.2
N	ITEL	6- 16	14 7/8	- 1/2	-3.2
O	LEASCO CORP	6-22	20 1/2	- 1/4	-1.2
O	LEASPAC CORP	0- 1	3/4	0	0.0
O	NRG INC	0- 1	1/8	- 3/16	-33.5
A	PICNEER TEX CORP	6- 9	8 7/8	+ 1/2	+5.9
N	U.S. LEASING	7- 12	11 1/8	- 3/4	-6.3

E X C H		PRICE			
		1976-77 RANGE (1)	CLOSE FEB 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	1- 5	5 1/2	+ 1/4	+4.7
O	DATA 100	6-13	7 5/8	+ 1/4	+3.3
A	DATA PRODUCTS CORP	5-15	11 7/8	+ 1/2	+4.3
O	DATA TECHNOLOGY	1- 3	3 1/8	0	0.0
O	DATUM INC	1- 2	1 1/8	- 1/8	-10.0
O	DECISION DATA COMPUT	1- 4	1 7/8	+ 1/8	+7.1
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	1- 4	4 1/8	- 1/4	-5.7
O	FARRI-TEK	1- 1	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1/2	0	0.0
N	HAZELTINE CORP	4-12	11 1/8	- 1/8	-1.1
N	HARRIS CORP	28-57	31 5/8	-2 3/4	-8.0
A	INCOINTECH CORP	9-20	14 1/2	+2	+16.0
O	INFOTEC INC	3- 7	6 1/2	- 1/4	-3.7
O	INFORMATION INTL INC	10-18	12	+ 1/8	+1.0
O	INTEL CORP	47-109	54 1/2	+ 1/2	+0.9
A	LUNDY ELECTRONICS	3- 7	4 3/4	0	0.0
O	MSI DATA CORP	3- 8	7 3/8	- 1/8	-1.6
N	NILGO ELECTRONICS	15-31	30 1/2	+3	+10.9
N	MCHAMK DATA SCI	3-10	7 1/4	+ 1/8	+1.7
O	PENRIL CORP	1- 3	2 5/8	+ 5/8	+31.2
A	PERTEC CORP	3- 9	8	- 3/8	-4.4
A	PCTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2-10	2	0	0.0
O	QUANTON CORP	4- 6	4 3/4	- 1/4	-5.0
O	RECOGNITION EQUIP	6-11	9 1/2	- 3/8	-3.7
N	SANDERS ASSOCIATES	6-11	10 5/8	- 1/4	-2.2
O	SCAN DATA	1- 4	1 1/2	+ 1/8	+13.6
O	STORAGE TECHNOLOGY	9-13	11 3/8	- 5/8	-5.2
O	T BAR INC	5-10	7 1/4	+ 1/8	+1.7
O	TALLY CORP.	4- 6	5 1/8	0	0.0
O	TEC INC	3- 9	8 1/2	- 1/4	-2.8
N	TEKTRONIX INC	45-69	58	-1	-1.6
N	TELEX	2- 5	3	-1/8	-4.0
O	WANGCO INC	11-22	17 1/2	0	0.0
O	WILTEK INC	1- 2	1/4	0	0.0

SUPPLIES & ACCESSORIES

O	ADVANCED SYSTEMS INC	1- 4	3 3/8	+ 1/8	+3.8
O	BALTIMORE BUS FORMS	3- 5	3 1/4	0	0.0
A	BARRY WRIGHT	6-11	10 7/8	+ 1/4	+2.3
O	CYBERMATICS INC	0- 1	5/8	0	0.0
A	DATA DOCUMENTS	25-45	41	0	0.0
O	DUPLEX PRODUCTS INC	13-24	14 3/8	+ 1/8	+0.8
N	ENNIS BUS. FORMS	6- 8	5 7/8	- 1/4	-4.0
O	GRAHAM MAGNETICS	8-13	13 1/4	+1 1/2	+12.7
O	GRAPHIC CONTROLS	13-19	15 1/4	- 3/4	-4.6
N	3M COMPANY	51-66	51	-7/8	-1.6
O	MOORE CORP LTD	32-51	32 1/4	- 1/2	-1.5
N	NASHUA CORP	11-20	16 1/2	-1	-5.7
O	STANDARD REGISTER	15-19	18 1/4	- 1/4	-1.3
O	TAB PRODUCTS CO	5-16	15 3/4	- 1/2	-3.0
N	UARC	19-25	20 3/4	-1 1/8	-5.1
A	WABASH MAGNETICS	4-12	11 3/8	- 1/8	-1.0
N	WALLACE BUS FORMS	19-25	20 1/2	- 1/8	-0.6

E X C H	1976-77 RANGE (1)	PRICE			
		CLOSE FEB 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE	
SOFTWARE & EDP SERVICES					
O	ADVANCED COMP TECH	1- 3	1 5/8	- 1/4	-13.3
O	ANACOMP INC	6-11	8 3/8	+ 1/8	+1.5
A	APPLIED DATA RES.	2- 7	6	0	0.0
N	AUTOMATIC DATA PROC	17-35	24	-1 3/4	-6.7
O	COLEMAN AMERICAN COS	2- 6	2	0	0.0
O	CCPU-SERV NETWORK	3-15	14 1/4	+ 1/2	+3.6
O	COMPUTER DIMENSIONS	3- 7	6 5/8	0	0.0
O	CCMP ELECTION SYSTMS	5- 9	7	+ 1/2	+7.6
O	COMPUTER HORIZONS	1- 2	1 1/4	0	0.0
O	COMPUTER NETWORK	2- 8	6 1/2	- 3/8	-5.4
N	COMPUTER SCIENCES	4- 9	8	- 1/4	-3.0
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	2- 6	2 3/8	- 1/8	-5.0
O	CCMSHARE	2- 9	6 1/4	- 1/4	-3.8
O	CATA DIMENSICONS INC	2- 5	4 1/2	+ 1/8	+2.8
O	DATATAB	1- 2	1 5/8	+ 1/4	+18.1
N	ELECTRONIC DATA SYS.	12-18	18 1/8	+ 3/4	+4.3
C	INFCNATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	2 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	3/4	0	0.0
O	KEANE ASSOCIATES	2- 4	2 3/4	+ 1/4	+10.0
O	KEYCATA CORP	1- 5	2 3/4	+ 5/8	+29.4
A	LOGICM	3- 8	8 1/4	+ 1/4	+3.1
A	MANAGEMENT DATA	1- 3	1 1/2	0	0.0
A	NATIONAL CSS INC	13-25	23 1/4	+1 1/4	+5.6
A	NATIONAL CATA CORP	4- 7	5 7/8	+ 1/4	+4.4
A	ON LINE SYSTEMS INC	17-23	20	-1 1/4	-5.8
N	PLANNING RESEARCH	3- 5	4 1/2	0	0.0
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIDATA INC	2- 5	2 1/8	- 1/4	-10.5
O	REYNOLDS & REYNOLD	13-21	18 3/4	- 3/4	-3.8
O	SCIENTIFIC COMPUTERS	1- 1	1 7/8	0	0.0
O	TYMSHARE INC	14-28	16	-2	-11.1
A	URS SYSTEMS	3- 5	3 7/8	0	0.0
N	WVLY CORP	1- 7	1 3/4	+ 1/8	+7.6
PERIPHERALS & SUBSYSTEMS					
N	ADDRESSOGRAPH-MULT	8-14	13 3/4	- 1/8	-0.9
O	ADVANCED MEMORY SYS	4-10	8 1/2	+ 1/2	+6.2
N	AMPEX CORP	5-10	8 1/2	- 5/8	-6.8
O	ANDERSEN JACOBSON	2- 4	3 1/4	0	0.0
O	APPLIED DIG DATA SYS	13-25	13	-1 1/4	-8.7
O	BEEHIVE MEDICAL ELEC	3-12	11 3/8	- 1/8	-1.0
A	BOLT, BERANEK & NEW	7-11	7 3/8	- 3/8	-4.8
N	BUNKER-RAMO	5-11	10 1/4	0	0.0
A	CALCOMP	4- 7	4 3/4	+ 1/4	+5.5
N	CAMBRIDGE MEMORIES	0- 6	1 3/8	-	-4.3
N	CENTRONICS DATA COMP	20-36	26 3/8	+1	+3.9
O	CODEX CORP	22-42	34	-2	-5.5
O	COGNITRONICS	1- 1	1	-	-5.5
O	CCMPUTER COMMUN.	1- 6	6 1/8	+ 1/4	+4.2
O	COMPUTER CONSOLES	4- 7	4 7/8	+ 1/8	+2.6
A	COMPUTER EQUIPMENT	1- 3	2	0	0.0
O	COMPUTER TRANSCIVER	1- 3	1 3/8	+ 1/8	+10.0
C	CCMTEN	4-13	12 1/8	- 1/4	-2.0
N	CONRAC CORP	20-27	25 1/4	+1	+4.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-EAL-WASH
 L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
 O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
 (1) TO NEAREST DOLLAR

**If you're a PDP 11/70 user,
don't let your boss see this ad.**

Unless you're already using Intel® memory.

Now Intel delivers dollar saving add-on memory for quality conscious PDP 11/70 users.

Reliable Intel memory has a price tag 40% lower than DEC's. And Intel memory is four times more compact than DEC's. So you can pack four megabytes of memory into a single PDP 11/70 memory cabinet.

Intel designed the in-1670 system to be totally hardware and software compatible with your PDP 11/70. Just install the in-1670 chassis in your memory cabinet, with no modifications necessary.

The in-1670 is a total system with each chassis including a 128K memory card, power supply, cooling fan and controller.

It's easy to expand memory by sliding in additional 128K cards, up to a full 1024K bytes per system. And your standard PDP 11/70 cabinet accommodates four in-1670 systems.

You get improved performance too. The in-1670 provides faster data transfer to and from the CPU—750 ns cycle time and 555 ns access time.

The in-1670's lower power consumption and better heat dissipation result in a cooler running, more reliable system. Error correction coding and error logging mean more uptime and improved maintainability. Single bit failures are corrected automatically. And the address of any double bit failure is recorded for easier maintenance.

It all adds up to everything you expect from Intel, the world's largest independent supplier of semiconductor memory.

If you've picked DEC to be your computer supplier, go with the best for memory, too—Intel. Intel delivers a complete line of add-in and add-on memory for the PDP 11 family. All with very attractive price tags.

The coupon will get you more information. A phone call will get you one of our system specialists. Intel Memory Systems, 1302 N. Mathilda Avenue, Sunnyvale, California 94086. Phone 408-734-8102.

intel® delivers.



Save
40%

intel® memory systems

Intel Memory Systems
1302 N. Mathilda Avenue
Sunnyvale, California 94086

Please send me information on these memory systems:

_____ for PDP 11/70	_____ for PDP 11/05-35
_____ for PDP 11/04-34	_____ for PDP 11/_____

Name/title _____
Company _____ Mail Station _____
Address _____ Phone _____
City/State/Zip _____